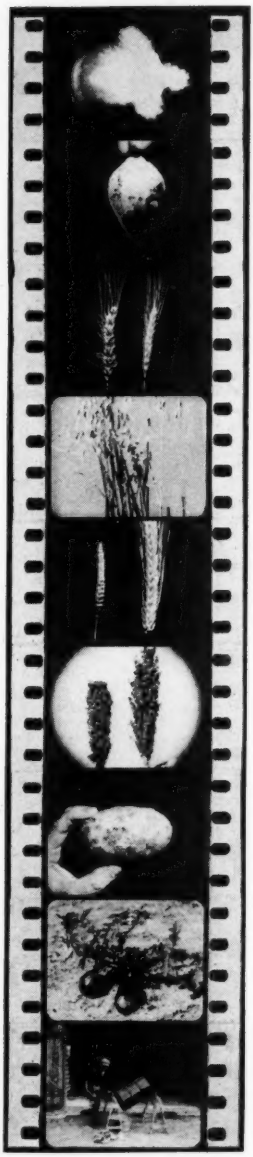
Better Crops WITH PLANT FOOD

April - May 1932 10 Cents

The Pocket Book of Agriculture

Educational Motion Pictures



on Seed-borne Diseases— Available for Your Use

The increasing economic importance of seed-borne plant diseases in relation to farm profits emphasizes the need of acquainting both students in agriculture and practical farmers with the disease symptoms on various crops; the losses caused by such diseases; the methods of combating them; and the profits to be obtained by controlling or eliminating them.

To meet this need we have prepared five two-reel motion picture films, one each on the following crops: Cereals, Corn, Cotton, Potatoes and Vegetables; also a one-reel picture on the Brown-Patch diseases of grass turf.

These pictures are educational in scope. They point out the tremendous losses caused by seed-borne diseases; show the typical appearance on the plant of many important surface seed-borne diseases; picture the effects of diseases on germination, stands and yields; and illustrate easy, quick methods for controlling such diseases.

Of special interest are the scenes of Gibberella developing on a kernel of corn; plants actually growing from treated and untreated diseased seed; marketing of smutty wheat, including inspection and dockage; the life history of smut; the 1930 national corn husking contest; the county agent's service to the grower; illustrations of the results of Agricultural Experiment Stations' tests in combating seed-borne diseases, including comparative yields from treated and untreated seed.

These films are available for use in your classes, at Farmers' week or for farm meetings. They are lent to you free of all charges. Write us for description of films and complete details on the condition for borrowing these films.

THE BAYER-SEMESAN COMPANY, INC.

Dept. 144-A **105 HUDSON STREET, NEW YORK, N. Y.**

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*
Editorial Offices: 19 West 44th Street, New York

VOLUME XVIII NUMBER ONE

TABLE OF CONTENTS, APRIL - MAY, 1932

Sophistication, *By Jeff McDermid* 3
Fertilizers Make Pasture Profits 5
By Clay A. Whybark
John DeLongchamp—Potato Champion 9
By L. R. Walker
Alkaline Soils Need Potash 10
By J. L. Boatman
Applying the Cure, *By W. H. Appleton* 13
The Inquiring Mind and the Seeing Eye 14
By Dr. A. S. Alexander
Delaware "Sweets" Respond to Potash 17
By Geo. L. Schuster
A Decade Vindicates the Keystone System 19
By B. O. Hagerman
Testing Fertilizers on Oregon Berries 22
By M. E. McCollam
Making the Club, *By Ford S. Prince* 23
National and State Sweet Potato Champion 25
By Chas. Kilpatrick
Fertilizers Pay in West Tennessee 26
By C. T. Ames
Dairy Feed at 2c per lb. of Protein 27
By D. R. Dodd
Alfalfa Longevity, *By R. F. Thomas* 28
On Heavy Soils Alfalfa Needs Phosphoric Acid and Potash, *By R. L. Cook* 30
Research on Potash 43

Agricultural and Scientific Bureau
N. V. POTASH EXPORT MY., INC.
of Amsterdam, Holland
Directors: J. N. HARPER G. J. CALLISTER

SWEET APRIL SHOWERS
DO BRING MAY FLOWERS.—*Tusser*

Better Crops with PLANT FOOD

PUBLISHED BI-MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK, WITH OFFICES AT 19 WEST 44TH STREET, NEW YORK CITY. SUBSCRIPTION, $1.00 FOR 12 ISSUES; 10c PER COPY. COPYRIGHT, 1932, BY THE BETTER CROPS PUBLISHING CORPORATION, NEW YORK.

VOL. XVIII NEW YORK, APRIL-MAY, 1932 No. 1

A lot about a little
or little about a lot?

Sophistication

By Jeff McDermid

JOURNEYS and ways to do them have changed like women's dresses. That is, they cover considerable yardage with less bother and you see more with less effort.

This by way of introduction to one of the reasons for universal sophistication, which is the inability to surprise anyone anywhere in these days of quick motion and mental stagnation. I have failed utterly to catch anyone unaware of facts that I hoped to spring on him as fresh and vivid news. This applies in the smallest hamlet as well as to the garbage collection route on which I reside in the civic suburbs.

And when you can't bring a single startling fact home to supper because the folks have heard it two hours ago on the radio, you need not ask why life has lost its zip. In analyzing the causes for this universal possession of all the latest facts, we may as well start with travel.

My Uncle Robert came west in an Erie canal boat, did his boyhood meandering with oxen, graduated as a man to horse power, used an auto in his

late maturity, and realized a hankering ambition to skim the clouds before his demise. He thought he was a well-informed man in his forties, but by the time he was seventy, nobody could tell him anything.

An acquaintance of mine living on an island off the shores of the Great Lakes saw his first airplane before he ever rode in an automobile. A friend of mine living a sequestered life on Prince Edward Island had up to 1927 never left that snug province in his life, although but half an hour is required to cross Northumberland Strait.

A city traveler's aid worker in our nearest city told me of a tourist tramp woman and six children who said they had flivvered across the continent five times and were not owners of any permanent residence.

However, in journeys as with all elements of progress, there are those who do and those who do not partake —even as with golf, home-brew, and wild-cat speculation. But the number of stay-at-homes is decidedly less than of yore.

IN former times there were in your hamlet and mine only four spots that catered to travel and related to journeys. These were the frame depot, the harness and carriage store, the blacksmith shop, and the livery stable. You recall how you envied the bustling drummers loaded with luggage as they tore down to the depot in hotel hacks. They were bound somewhere into the realm of the unknown, and were able to talk nonchalantly of all manner of people and were wise to distant places. The livery stable was a starting point for less ambitious travelers, but it also had its thrills. The smithy and the harness store merely serviced the local pikers who contented themselves with using horses as a means of existence rather than as a symbol of flight.

Choice locations, now used by gas stations in rival proximity, were in those days used by country banks or corner stores, staunchly upholding local pride and status quo rather than serving as direction points to show one the quickest route *out* of town or the best road to the *next* trading center. Your town perhaps was standardized in dinginess and conservatism, just as it is rubber-stamped with gaudy chain store fronts and national oil signs in these duplicating days.

Yet your town was then unconscious of being similar to any other meeting place of mankind and boasted of its distinct and individual advantages. To seek a hasty departure from its corporate limits was usually a sign of criminal guilt or extreme bucolic shyness. You simply loitered because it was bad taste to hustle out of town unless your barn was afire or the doctor came with you.

Coming from this stay-at-home proclivity, there developed a certain independent calmness of spirit which the advent of the telephone and telegraph did not wholly erase. News, it is true, seeped into the village and made its belated appearance in the boiler print sent in by express and read of evenings by the contented citizens. Yet the personal contact factor as an element in forming opinion had not arrived with the limited means of travel then afforded.

ONE could not ride in fresh from the state capitol or the metropolitan exchanges crammed with frenzied facts and burdened with perplexing contradictions. And furthermore, one could not at one and the same time remain at home and be hundreds of miles away, as the villager is now with his national hook-ups and distance-defying jazz.

News is anything that is new, which means it is a relative thing. Hence in our old village now there really is nothing new that stays new beyond the next turn of the dial or the arrival of the next auto bus. Every old familiar face wears an expectant, nervous

(*Turn to page 62*)

Intensive grazing on fertilized pasture land in the Pacific Northwest. These cows are getting a high protein, high mineral feed, which means healthy animals and milk at lower cost.

Fertilizers Make Pasture Profits

By Clay A. Whybark

Puyallup, Washington

FOR the past several years, human beings have been urged to eat food with the right amount of vitamins, proteins, and only a certain number of calories. It is common knowledge that with the proper balance of these ingredients one can build up one's resistance to many diseases and also maintain the right proportions of the body.

Lately, the prevalence of nutritional troubles in animals, pronounced mineral deficiency diseases, has brought before us the problem of a proper diet for animals, as well as for humans.

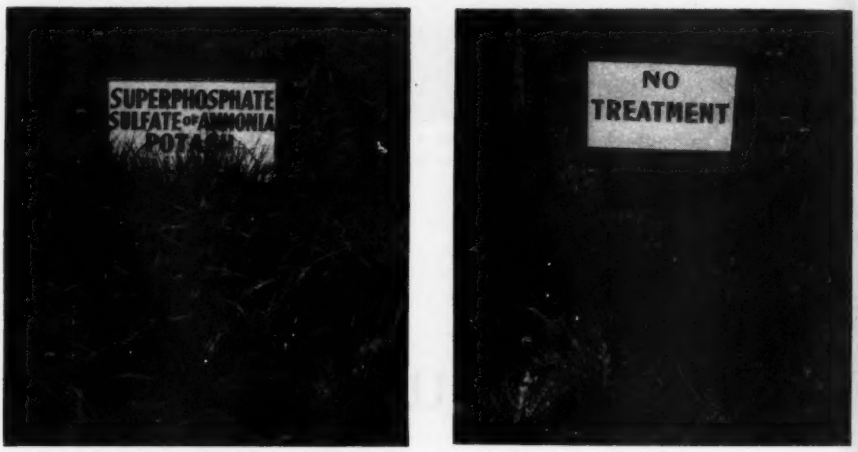
Dairy cows supply a great deal of the wealth of Western Washington, and a consideration of their proper diet concerns the whole dairy industry. Pasturage always will make up a large part of the diet of the animals in this section. The fact that the natural growth of pasturage here is good has helped to make dairying a successful enterprise. It is very important, therefore, to care for pastures in the right way, in order to produce a large yield of pasture grass rich in protein and minerals.

Because pasture land, and hay land too, have generally received no treatment to build up soil fertility, yields are getting lower, and the feed taken from these lands is becoming lower in

feed value and deficient in minerals. This condition is bound to result in low vitality of the animals being supported by this kind of feed, as well as in lowered quality of the dairy products.

To determine that the use of fertilizers on pasture lands was a promising means of producing more pasturage of better quality, a series of fertilizer tests on pasture land were conducted during the past three years. These were located throughout Western Washington on several different soil types and in typical dairy sections.*

Plot 1 (LNPK)	250 lbs. Sulphate Ammonia 600 lbs. Superphosphate 200 lbs. Muriate Potash 1,000 lbs. Hydrated Lime
Plot 2 (LPK)	600 lbs. Superphosphate 200 lbs. Muriate Potash 1,000 lbs. Hydrated Lime
Plot 3 (PK)	600 lbs. Superphosphate 200 lbs. Muriate Potash
Plot 4 (P)	600 lbs. Superphosphate



Comparative growth of pasturage on complete fertilizer and check (no treatment) plots on one of the series of pasture fertilizer tests.

Each series of plots included four distinct fertilizer treatments and two check plots. The individual plots were one-tenth acre in area. On each plot two square rods were fenced off, so that animals would not disturb these areas and hand cuttings could be taken. The rest of each plot was left to be grazed by the animals.

The fertilizer treatments and amounts per acre on the plots were as follows:

All of the fertilizer materials were applied each year during February or March.

The effects of fertilizers on yield of dry matter and on composition of the grasses were studied.

In the second year of the work, only half the original amounts of fertilizer per acre were applied to the plots. During this year, the analytical work on the grasses was carried on. If the original amounts of fertilizer had been continued, results of the analytical work might have been even more pronounced.

On some of the plots, two pasture cuts and one hay cut were made; and on the other plots, three pasture cuts and one hay cut were taken. The

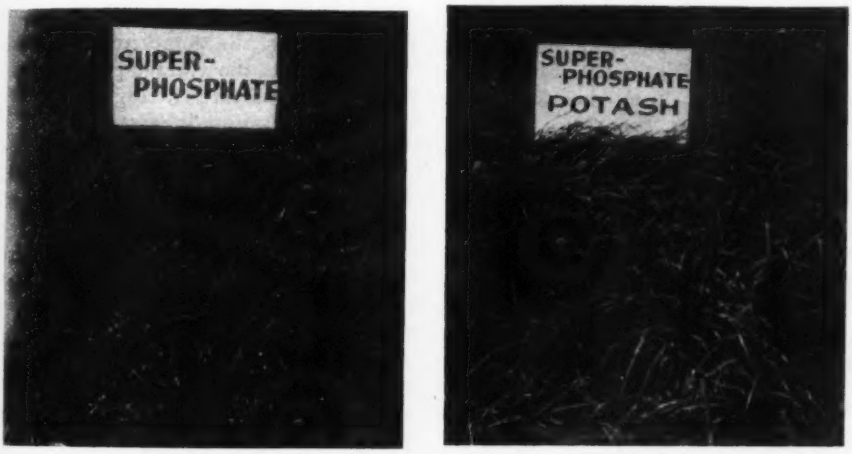
* Field work on this series of tests was started in 1929 by M. E. McCollam. Later through arrangements with the Soils Section of the Washington State College analytical determinations were made by C. A. Whybark.

method of taking these cuttings was to go inside the fenced-in area and from each plot cut square-yard areas from three different locations within the plot. This area then was marked so that each succeeding cut could be taken from the same place. This gave an accurate check on the amount of pasture available from each plot. The rest of the grass within the plot was allowed to grow so that a check on the amount of hay available could be had.

As soon as the cuttings were made, the grass was weighed immediately to get the total green weight, and then a 100-ounce representative sample was taken to determine the amount of dry matter. In drying this sample, the drying oven at the Western Washington Experiment Station was used. This material was dried at a temperature of 100° F., which would naturally cause the material to be much drier than if it had been air dried. After the percentage of dry matter was determined, the grass was ground through a 40-mesh sieve, and on this material the analytical work was carried on.

From the yields it is evident that potassium and nitrogen were the elements causing the largest increases in pasture dry matter. Phosphorus was quite effective also, and the complete fertilizer treatment on Plot 1 seems to be justified for the highest dry-matter returns. Results from the lime were indeterminate, and considerable doubt arises as to its effectiveness in increasing pasture yields.

The effects on the hay crop were somewhat different in that phosphorus and nitrogen were the elements caus-



Growth of pasturage on the superphosphate alone plot compared to superphosphate with potash on one of the series of pasture fertilizer tests.

YIELDS

Effect of Fertilizers on Yield of Pasture

(Average yields from six series of pasture fertilizer plots)

Treatment	*Yield* *Green Grass per Acre* *Season Total*	*Yield* *Dry Matter per Acre* *Season Total*
Plot 1. NPKL	34,854 lbs.	6,827 lbs.
Plot 2. PKL	30,417 "	5,885 "
Plot 3. PK	29,359 "	5,741 "
Plot 4. P	24,434 "	5,039 "
Check (No Treatment)	21,981 "	4,769 "

Effect of Fertilizers on Yield of Hay

(Average yields from six series of fertilizer plots)

Treatment	*Yield Green Grass per Acre Season Total*	*Yield Dry Matter per Acre Season Total*
Plot 1. NPKL	25,914 lbs.	7,002 lbs.
Plot 2. PKL	25,426 "	6,532 "
Plot 3. PK	25,275 "	6,397 "
Plot 4. P	20,620 "	6,065 "
Check (No Treatment)	19,141 "	5,329 "

ing the largest increases in dry matter. However, potassium gave a definite response, and here again the complete fertilizer on Plot 1 has been the most effective for a high yield of hay dry matter. The effectiveness of lime in this case, may again be considered doubtful.

Analytical determinations on both hay and pasture cuttings from this series of fertilizer tests prove that the feeding value of pasture and hay can be favorably influenced by fertilizer treatment.

For purposes of comparison we will consider the complete fertilizer (NP KL) plots and the check (no treatment) plots.

The percentage of ash can be changed considerably. For instance, the average percentage of ash in the pasture cuttings taken from the check plots is 9.1 per cent as compared to 9.6 per cent of ash in the complete fertilizer (NPKL) plots. The percentage of ash was increased over the check in all the plots fertilized. There was also an increase in the percentage of ash in the hay cuts taken from the fertilized plots.

The percentage of potassium in both the pasture cuts and the hay cuts was also greatly changed by the application of fertilizers. On the check plot the average percentage of potassium in the pasture cuts was 1.43 per cent and in the hay cuts it was 1.4 per cent. On the complete fertilizer (NPKL) plots the average per cent of potash in the pasture cuttings was 2.07 and in the hay cuts it was 1.72.

In this work it was found that the percentage of potassium constituted from 20 to 25 per cent of the total ash.

Again in the case of phosphorus it was found that the content could be increased by fertilizer treatment. Pasture cuttings from the check (no treatment) plots showed an average of 0.31 per cent phosphorus, and those from the complete fertilizer (NPKL) plots an average of 0.46 per cent. This difference of 0.15 per cent is quite a significant figure.

The average percentage of phos-

(*Turn to page* 55)

Hand-cuttings of pasturage from one of the fertilizer tests. The material from each plat, after being weighed, was oven-dried and analyzed.

John DeLongchamp—Potato Champion

By L. R. Walker

County Agent, Marquette, Michigan

JOHN DE LONGCHAMP of Champion, Marquette county, Michigan, was acclaimed Upper Peninsula premier potato grower by D. L. Clanahan, crops specialist of the Michigan State college, at the Upper Peninsula potato show last October. This is a case of a champion coming from Champion. Mr. DeLongchamp won this honor by producing 538 bushels of Green Mountain potatoes on each of his six acres. This yield of 538 bushels per acre is the second highest ever recorded in Michigan.

Success Came Gradually

The first time I visited Mr. DeLongchamp was in 1916. I made the visit during oat harvest and I found the father in the oat field on a wagon loading oats with seven boys of various sizes and ages pitching bundles on the load. Since that time, he has made a success of growing potatoes and this is how it came about:

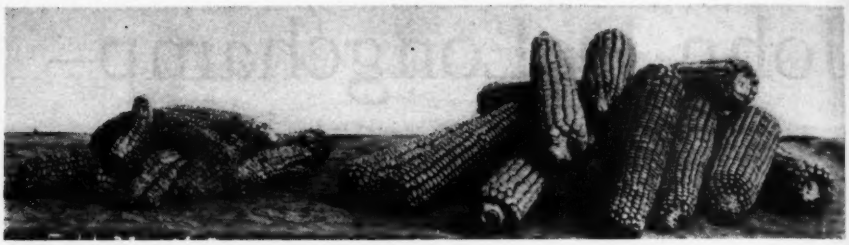
Mr. DeLongchamp was induced by the county agricultural agent to purchase a few bushels of good, clean Green Mountain seed potatoes from a neighbor. The new seed was planted alongside his own seed stock and outyielded his own by a considerable number of bushels.

He decided to discard his own stock and plant the new strain entirely. He carefully selected his seed from the bin; that is, he did not select little potatoes, as many growers do. He sorted out a bushel or more of tubers which looked much alike, were typical of the Green Mountain type, and all weighed eight ounces. He treated all of his seed before planting to kill any scab or black scurf that might be on them. He cut each eight-ounce potato into four pieces as he planted, thus getting four consecutive hills from the same tuber. This special seed was planted in the regular potato field and given the same care, but the potatoes were dug by hand at digging time. The best hills were saved for seed, and it was found that if one hill was good, there were three others just like it. This gave a goodly number of bushels of choice seed. I remember Mr. DeLongchamp told me that he wouldn't take five dollars a bushel for these tubers.

Always Has Large Yield

This select seed was planted in the spring of 1921, and he harvested over 300 bushels per acre in the fall. He hasn't dug under 300 bushels per acre during the 10 years since. This same year he joined the Michigan Potato Growers' Association and had his field inspected. The field passed inspection as certified seed, and he has been a member of the association ever since. His fields and crop have passed inspection every year, except one. This exception was due to neglect in spraying with Bordeaux and his crop failed to pass inspection because of late

(*Turn to page* 51)



The corn on the left is the yield from five hills which received no potash. The corn on the right is from five hills which received potash at the rate of 200 pounds per acre. This demonstration was made on the "alkali" land of Kossuth county, Iowa.

Alkaline Soils Need Potash

By J. L. Boatman

Extension Specialist in Soils, Iowa State College

THE dreams of the ancient alchemists never embodied anything more marvelous than the crop of hard, golden corn that springs up, as if by magic, from the non-productive "alkali" soils of Iowa, when a two or three hundred pound application of light-colored muriate of potash salts is worked into this black soil. Putting white salts on black soil and getting from this combination first green then yellow corn is a color change that would satisfy the most exacting slight-of-hand performer.

The term "alkali" is a colloquial term which farmers use to designate certain unproductive areas which develop when swamps, sloughs, or bogs are drained. It is a conservative estimate that there are at least 500,000 acres of such "alkali" land in Iowa, mainly in the north half of the State and occurring in some 40 counties. In size, these "alkali" areas range from a few square rods to several hundred acres and they are usually found in either the Wisconsin or Iowa glacial drift regions.

While these "alkali" soils contain an abundance of nitrogen, they are, generally, very unproductive. They contain a large amount of lime, either in the form of calcium carbonate or calcium bicarbonate, and other soluble salts in such quantities that when the wet land is drained and the soluble salts thereby concentrated, the soil solution is too concentrated for most cultivated plants. On the edges of these areas, there is so much of these soluble salts that as the water evaporates in the spring, the salts are deposited as a white powder or crust on top of the black soil. Those spots in which the soluble salt concentration is relatively high, the farmers designate the "hot alkali." The hotter the alkali, the greater is the treatment necessary to correct the condition.

Some of these soils have an acid-

neutralizing value of 40 per cent which means that two tons of such soil will neutralize as much soil acidity as a ton of fairly good limestone.

On "alkali" land, corn generally germinates well. If there is plenty of moisture, the early growth will be better than when the soil is dry. However, as soon as the warmer weather of summer comes on, the salts in these areas become so strong that they retard the plant's growth, and if the plant comes to maturity at all, it is a weak, puny thing with small stalks and soft chaffy corn that has no feeding value. Oats do their growing earlier and hence seem to stand the "alkali" better, although they usually have big straw with scantily filled heads, and are apt to lodge badly.

Discover Value of Potash

Trial and error methods early taught the farmers who had this soil that very heavy applications of manure would lessen the difficulty, and to this end, it was common for farmers to concentrate the entire year's supply of manure on these spots. This solved the problem, but it was very wasteful of the farm's manure supply since these spots were known to contain large percentages of nitrogen along in the summer which meant that the nitrogen in the manure was heaped on an already over-abundant supply.

It was quite by chance, as many farm problems are often solved, that Iowa farmers first found that muriate of potash in 200 to 300 pound - per - acre doses would awaken these waste spots and make them blossom forth like a regular corn field.

In 1925, H. W. Warner, who was my predecessor in the soils extension work in Iowa, was offered by a potash company a quantity of muriate of potash put up in 100-pound bags. These bags were sent promiscuously all over Iowa with the suggestion that farmers spread this material on troublesome farm lands and note the results.

Care Brings Good Results

One of my first jobs as extension specialist in soils in Iowa was to write out to these farmers and ask them what results they had had. There were few satisfactory replies. Many had started with good intentions but had neither weighed the corn nor made careful applications or observations.

County Agent P. C. Weichmann, then in Hardin county, put one 100-pound bag of this potash with a farmer of that county. The farmer proved to be a good experimenter. "Here's a good chance for me to find out what this will do on my 'alkali' land," he said, and so he very accurately staked out a quarter acre of this black soil and carefully applied the 100 pounds of potash to it. He went further and measured the results and when the

Potash made the difference. Left: corn fertilized with 300 pounds of potash and 200 pounds of 20 per cent superphosphate. Right: corn fertilized with only 200 pounds of superphosphate. C. A. Jacobson Farm, Clear Lake, Iowa.

letters of inquiry came back, his letter was full of information on this very troublesome question of "alkali" soils. The farmer stated:

"The 'alkali' ground, on which I applied the muriate of potash at the rate of 400 pounds per acre, made 75 bushels of corn. The untreated 'alkali' soil made only 20 bushels and it was poor stuff at that."

That was an eye-opener, and we began looking around to see if this experience could be duplicated elsewhere.

More Evidence Found

In 1928, during a soils extension meeting in Pocahontas county, B. W. Allen, who operates several hundred acres there, put this question:

"I have several hundred acres of this 'alkali' land; how would you recommend that I treat it?"

"Put on muriate of potash at the rate of 200 to 300 pounds per acre on a few acres and try it out," I advised him.

"I'm going to get enough to treat an entire 85-acre field."

"I'd rather you wouldn't," I came back, "but if you do, I want to ask a favor. Leave 12 rows down through the field untreated, so you can check up on yourself and get the difference in yield of corn on the treated ground."

Obtained Satisfactory Results

Mr. Allen did this, and when I saw him in the fall of 1929, he pointed with pride to a cribful of nice yellow corn, the first he ever had had off that field.

"I got about 40 bushels per acre off the rest of the field," he told me as we looked over the sound, hard ears, "but from those 12 untreated rows, we got nothing to speak of, just soggy ears partly filled out, the dry ones light and just about fit for kindling."

With no additional treatment in 1930, Mr. Allen reported it the best field of corn on the farm, and in 1931, it was in barley and made a good crop.

Several farmers on this "alkali" soil now have tried potash and the same satisfactory results have been obtained.

In 1929, Henry Helmke of Kossuth county treated "alkali" soil with 200 pounds of muriate of potash. The results were in line with those reported above. The field was in oats in 1930 and Mr. Helmke noticed similar differences in yield, but did not weigh them. In 1931, the field was put into corn again with no additional treatment. Five representative hills from the treated area were compared with the corn grown on five hills untreated, and again a striking difference in yield was noted.

Recommend High-potash Fertilizers

Out of these experiences and others has grown our recommendation to broadcast from 200 to 300 pounds of muriate of potash on these "alkali" spots, after the ground is plowed, and work it thoroughly into the soil. In the trials and observations we have made, we have found that for corn on most of these soils phosphorus in any form has very little, if any, value. Some farmers have checked 2-8-16 or 0-16-8, in the hill with their corn with fairly good results. We think they would have had the same results if they had left the nitrogen out.

Just now, we are working on the problem of making hill and row applications of high-potash fertilizer combinations through the use of a fertilizer attachment on the corn planter. The experiences of farmers who have tried this method indicate that we may expect good results from this method of applying the potash.

But of this we are sure: without potash, or a heavy application of manure, these "alkali" soils are very unproductive; with 200 to 300 pounds of potash per acre, they often prove the most productive land on the farm.

The entire field of soybeans was fertilized with 500 pounds of basic slag per acre. The stalk in the man's left hand is representative of the plants from the area that received no potash. The stalk in the man's right hand is representative of the plants from the area that received as a top-dressing 250 pounds of 20 per cent kainit per acre.

Applying the Cure

By W. H. Appleton

Gadsden, Alabama

ON July 1 last summer Vocational Teacher C. C. Coats brought some sick corn and soybean plants to the office of County Agent J. B. Mitchell of Madison county, Alabama, from the farm of O. C. Hammond of New Market. The blades of corn were yellow, dead around the margin, and when the stalk was cut at the crown of the roots, root rot was found. In some sections "frenching" is the term used to designate the injury. The soybean plants were 10 inches tall, yellow, and had lost a good portion of their leaves. The soil from which these plants were taken was Hollywood silt loam, and the field of soybeans had received 500 pounds of basic slag per acre, and the corn field nothing. Every year there are thousands of acres of potash-starved cotton in Alabama, but who ever heard of potash-starved corn in this section? However, Mr. Mitchell and I, after studying the corn and soybean plants, decided that this was a case of potash starvation.

The situation was puzzling, and Mr. Hammond said that the proposition had him "whipped." The season was very dry and there were no signs of rain to come. It was finally decided to see what an application of potash, even at this late date, would do for the sick crops. The next day a top-dresser of 100 pounds of muriate of potash to an acre of the corn and 250 pounds of high-grade kainit (20%) to an acre of the soybeans, were ap-

(*Turn to page* 61)

The Inquiring Mind *and the* Seeing Eye

By Dr. A. S. Alexander

University of Wisconsin

Not soon, not soon, will such another come,
Friend and upholder of the just and true;
Of humor gracious, and of truth the sum,
His friends were legion, and his foemen few.
—Maj. S. H. Myers.

SCOTCH-IRISHMEN have made their mark in America. They have been "men of parts," characterized by the proverbial canniness and dourness of the Scot, and the vivacity and wittiness of the sons of the Emerald Isle.

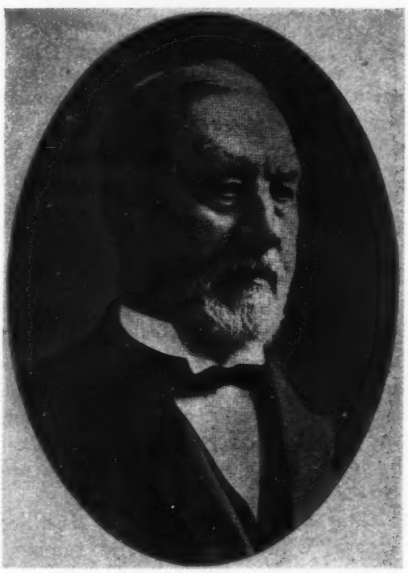
The Scottish word *dour* signifies not only hard and hardy, but bold, intrepid, and inflexible. All of these attributes of character were possessed by the late Henry Wallace of Iowa, and were needed by him in his long and eventful life. Like others of his ancestry, he fought his way against all obstacles, by sheer force of character, indomitable will power, aggressiveness, perseverance, integrity, and brains, until he became one of the foremost and most influential agricultural editors of his day. Withal, he lived true to the faith of his fathers and, throughout his career of usefulness and leading, was dominated by the loftiest of Christian precepts and principles.

On March 19, 1836, Henry Wallace was born near the little town of Newton, in Westmoreland county, Pennsylvania. His father, John Wallace, came from Ulster, North Ireland, where his ancestors had moved from Scotland at the time of the Covenanter persecutions, about 1680. His mother, Martha Ross, was of like parentage and from the same section of Ulster.

During the early years of his life, Henry was the mainstay of his parents on their Pennsylvania farm. While obtaining the rudimentary education offered by the local schools, he was also carefully trained by his parents in uprightness, godliness, and habits of industry and frugality. When eighteen years old, he decided to become a minister of the gospel. This determination was approved by his parents, although they could ill afford to lose his help on the farm. How to obtain a higher education was then the question. That was settled by sending him to a so-called "College," which cousins of his mother had established in Noble county, Ohio. For one year he studied there; then spent his next summer's vacation in work on the home farm. That autumn, he entered Genava Hall, a small college located in a community of the descendants of the old Scottish Covenanters, near Belle Center, Logan county, Ohio. For two years he remained there under the guidance of some fine inspirational teachers, whose influence helped to mold in him a sterling character.

In 1857, he became a student in Jefferson College (now known as Washington and Jefferson) then lo-

cated at Canonsburg, Pennsylvania, where it was established in 1802. There he graduated in 1859, and in July of that year he went to Kentucky to teach in a little college at Columbia. The views he expressed there, on matters which later brought on the Civil War, made him *persona non grata* in the South; therefore, he returned home. In 1860 he entered the United Presbyterian Theological Seminary at Allegheny (now Pittsburgh) Pennsylvania, and in 1861, he changed to the seminary of the same denomination, at Monmouth, Illinois.



HENRY WALLACE

About the first of April, 1862, he was licensed to preach, and spent a month at Albia, in Monroe county, Iowa, after which he was assigned to the mission field in Rock Island and Davenport. It is related that he was one of the very few ministers who were able to preach understandingly to the river men, who made headquarters in those cities.

On September 10, 1863, he was married to Nannie Cantwell, daughter of Colonel James Cantwell, at Kenton, Ohio. Later in that year, he was appointed a member of the Christian Commission, a voluntary organization of church people the nation over, which rendered service to the soldiers of the Civil War. He was with the army at the siege of Petersburg and in pursuit of Lee. When on the train which took Grant into Richmond, he heard of the assassination of President Lincoln.

Resuming his ministry in Rock Island and Davenport, he remained there until the winter of 1870-71, when he was called by the congregation of the United Presbyterian Church at Morning Sun, Iowa. His health not being good, he thought a pastorate in a country community might be beneficial. This hope was not realized, however, and in April, 1877, he obeyed his physician's imperative command that he at once resign from the ministry and seek health in the open country. The year previous, he had buried the last of his seven brothers and sisters who, like their mother, died of tuberculosis. For several years he had been ill, and at the time he left the ministry, there were strong indications that he would go the way of the other members of the family.

A Fight for Health

Then began the stern fight against tuberculosis which he waged with the dour persistence and determination of the Scot. He and his youngest brother John had become sole heirs of the family estate and had invested their money in land. Most of it was located in Adair county, Iowa. There Henry decided to go and develop his farms. With his family he moved to Winterset, the county seat of Madison county, which adjoins Adair county on the east. Here he was within driving distance of his several farms and where his family could enjoy the more comfortable living conditions, and especially the better educational opportunities. of the small town.

Driving to and from his prairie farms, twenty-three to thirty miles from Winterset, was exhaustive work; but it gave him the fresh air he needed

as a remedy for the Great White Plague. On one trip he lost consciousness and was found, some hours later, in his buggy, the ponies quietly grazing on the open prairie. After that he never drove unaccompanied. Gradually, he gained health and strength. So far as possible, he lived an outdoor life, sleeping many hours at night, and drinking large quantities of cream and "strippings." He determined to get well and in time won the victory over his fell enemy. Within two years, marked improvement was apparent. At the end of five years, he had regained his normal weight and was again able to work.

Believed in Experimenting

Then, with renewed vigor, he engaged heart and soul in developing his various farms. His branch of the Wallace family had been farmers for hundreds of years. He was "to the manner born," and knew all of the approved methods of farming. Besides that, he had a strong inclination for experimental work. A clear thinker and keen observer, he put brains as well as brawn into his farming. On one farm he specialized in dairying; on another, in cattle feeding; and on a third, in hog raising. Thus, he had scope for experimentation; and he obtained experience which was to prove wonderfully valuable in his later life as the editor and publisher of his renowned *"Wallace's Farmer."*

He learned how to do things and had training and ability as a speaker and writer, which enabled him to impart his knowledge to the thousands of farmers and others who looked to him for light and leading. After a time he sold all but two farms, which contained nine hundred acres. On these he concentrated his attention. He established a creamery and a herd of Jersey cattle. His was one of the first creameries in that part of Iowa. He bought an imported draft stallion; encouraged better horse-breeding in his district; and also built up an excellent herd of pure bred Poland-China swine. He planted groves of evergreens and deciduous trees for windbreaks, in a country where trees were few. He was one of the first to successfully grow clover in that locality, where most of the farmers said it would not succeed. Through his efforts, the growing of clover became widespread. Recognizing it as one of the greatest blessings of the plant kingdom, for farmers, he became a most convincing and effective preacher of the clover gospel, and converted thousands to his way of thinking.

Now came Henry Wallace's true mission in life, with a far wider field and inestimably greater audience than he could have had in a local pulpit. He became a country-wide educator, with his pen, and a powerful exponent of better farming, clear thinking, and right living.

"My aim," he said on one occasion, "is to develop the agriculture of the nation, and especially of the West; to aid in developing a class of farmers mightier than Caesar's legions, more invincible than Cromwell's Ironsides, the stay of the country in war, its balance wheel in peace, when other classes lose their heads. I wish so to live and work that when I am dead and gone, my name will be remembered by thousands as a man who has left the world better than he found it."

This aim was abundantly fulfilled. Henry Wallace's name and fame are remembered and treasured today.

Realized Newspaper's Worth

Regarding Mr. Wallace's work, Harvey Ingham, editor of the *Des Moines Register and Leader*, once said that no man realized more fully the wonderful place the newspaper has come to hold. Nobody knew better the great interests of humanity it could be made to serve. There was pulpit and school in it for him; he was both preacher and teacher, at the same time he was editor. He made his columns a correspondence school for the farmers of the great Midwest, in the principles of right liv-

(*Turn to page* 59)

This plot was fertilized with a 3-8-10 at the rate of 1,500 pounds per acre and gave a yield of 546 bushels of sweet potatoes per acre. The check plot fertilized with a 3-8-8 yielded 404 bushels per acre in 1929. The average yield for three years from the 3-8-10 fertilizer was 351 bushels, while the 3-8-8 produced 297 bushels.

Delaware "Sweets" Respond to Potash

By George L. Schuster

Delaware Agricultural Experiment Station

RESULTS of three years' experimental work at the Delaware Experiment Station indicate that the average yield of sweet potatoes in the State can be greatly increased by more liberal use of fertilizers high in potash. The results of this work also show convincingly that the more concentrated forms of potash, muriate and sulphate, are superior to manure salts and kainit as sources of potash. Not only were the yields larger when the more concentrated sources of potash were used, but there was a lower percentage of rots in storage and hence a higher percentage of marketable tubers. This was particularly noticeable on the plots where the potash was in the sulphate form.

Authorities are generally agreed that potash is a very important element in the production of sweet potatoes. Poole of New Jersey found that sulphate of potash gave larger yields than either muriate or kainit. Houghland of Maryland ranked sulphate of potash first, muriate second, and manure salts third. Earlier work in Delaware, however, did not show any advantage of sulphate over muriate of potash.

A 3-8-8 fertilizer was used on all check plots since it has been the prevailing fertilizer for sweet potatoes in

Delaware. One-half of the nitrogen in this fertilizer was derived from nitrate of soda and the other half from sulphate of ammonia; the phosphoric acid was derived from superphosphate; and the potash from muriate of potash. The potash was stepped up to 10, 12, and 14 per cent on other plots, and the potash was derived from sulphate, muriate, manure salts, and kainit. The fertilizer was broadcast at the rate of 1,500 pounds per acre two to three weeks prior to planting time.

The results are as follows:

Treatment	Yield Bus. per Acre				Gain over	Av. % Stand	Per cent
1,500 lbs. per acre	1929	1930	1931	Av.	Checks	1929-30	Primes
3-8-8 checks	404	150	338	297		93	83
3-8-8 KCl	399	119	323	280	—17	94	83
3-8-8 K_2SO_4	407	131	336	291	—6	94	84
3-8-8 M.S.	381	136	278	265	—32	92	86
3-8-8 Kainit	342	116	233	230	—67	91	82
3-8-10 KCl	521	190	343	351	54	93	86
3-8-10 K_2SO_4	375	136	332	281	—16	94	82
3-8-10 M.S.	425	193	349	322	25	82	84
3-8-10 Kainit	280	123	360	254	—43	67	88
3-8-12 KCl	397	133	409	313	16	90	79
3-8-12 K_2SO_4	444	142	383	323	26	93	84
3-8-12 M.S.	403	117	344	288	—9	84	89
3-8-12 Kainit	242	115	275	211	—86	58	86
3-8-14 KCl	429	130	393	317	20	93	88
3-8-14 K_2SO_4	406	157	420	328	31	94	82
3-8-14 M.S.	404	108	301	271	—26	90	85
3-8-14 Kainit	294	124	230	216	—81	70	87

The average yield for the three-year period for all plots receiving muriate of potash, exclusive of checks, was 315 bushels per acre. The average yield for all plots receiving sulphate of potash was 306; for those receiving manure salts 286; and for those receiving kainit 228 bushels per acre. The average yield of all plots receiving 8 per cent potash, exclusive of checks, from all potash sources was 266 bushels per acre. Those receiving 10 per cent potash from all sources gave an average yield of 302 bushels; those receiving 12 per cent, 284; and those receiving 14 per cent, 283 bushels per acre. The highest average yield for the three-year period was 351 bushels per acre. This plot received 1,500 pounds of a 3-8-10 fertilizer per acre. The 10 per cent potash was derived from muriate.

The average stand for muriate was 93 per cent; for sulphate 94 per cent; for manure salts 87; and for kainit 72 per cent. Kainit and manure salts decreased the stand materially when more than 8 per cent was used. The various sources of potash and percentages of potash did not influence the percentage of primes materially.

Two baskets of potatoes from each plot were stored immediately after harvest and held at a temperature of 80-85°F. for two weeks and then at 55-65°F. until the last of January. They were weighed when placed in storage and again when removed. All rots were weighed separately. The composite results are given below:

Treatment	*Per cent Shrinkage*	*Per cent Rots**	*Per cent Marketable*
Checks	18	20	62
KCl	18	18	64
K_2SO_4	17	12	71
M.S.	17	35	48
Kainit	21	32	47

* Surface rot, black rot, and soft rot.

The potatoes were considered to be as clean and free from disease as any normal crop, and all the potatoes were marketable at the time they were put

(*Turn to page 56*)

A Decade Vindicates the Keystone System

By B. O. Hagerman

Agricultural Agent, Pennsylvania Railroad

SAND land is and has been a soils problem. With "Land Utilization" today occupying the center of the agricultural economic stage, the problem is more acute than ever and few are the States in the Great Lakes area not affected.

Some of the more sub-marginal lands in these States never should have been robbed of their natural covering, but that is "water over the dam" and on hundreds of thousands of acres of these light soils, thousands of farmers are already established, endeavoring to eke out an existence.

For the farmer on the better grades of this sand land, there is hope. He must, however, adapt his methods to his conditions.

The Pennsylvania Railroad, through its Agricultural Department, for the past 15 years has been working with this type of soil through the medium of its Demonstration Farm of 160 acres at Howard City, Michigan.

The first five years with this farm were spent in purely experimental work. From the results of these first five years, certain crops were selected and methods adopted which were to form the foundation for a definite Sand Land Management Program. For the past 10 years the original program has been followed with but slight variations. It was based on Lime, Legumes, and Livestock. It has six definite features: 1—Conservation of soil moisture; 2—A sweet soil; 3—Leguminous crops; 4—Profitable livestock; 5—The efficient use of commercial fertilizers; and 6—A definite adaptable cropping program or crop rotation.

It is about the fifth feature, the efficient use of commercial fertilizers, that the following is written:

When this program was adopted in 1921, we held the idea that in order to get the most economical returns from commercial fertilizers, we should first incorporate this light soil with all the humus we could. This we started out to do by plowing under rye and vetch, second growth sweet clover, and barn-

One of the fields of the demonstration farm before it was cleared up to be cultivated.

This is the same field, 10 years later, as that shown in the first picture.

yard manure. Progress was fairly satisfactory. Our first field of alfalfa was started in 1924. The stand was excellent. It held great promise. The third spring it didn't look so good. June grass was where alfalfa should have been. We top-dressed it with a 3-10-4 commercial fertilizer. The result was a greatly increased tonnage of hay. Closer observation, however, revealed that the increase consisted mostly of June grass.

By 1928 other crops had been responding amazingly to various fertilizer combinations, as indicated by the constantly increasing "net crop returns" varying from $62.21 to $1,650.00. Why didn't our alfalfa and sweet clover do likewise? Could it be that we weren't using the right analysis fertilizer? Let's see, here is something we didn't learn during our first five years of experimental work.

In 1928 we put on two series of fertilizer plots, one on sweet clover and one on alfalfa, with the following results:

It can be noted that the muriate of potash increased the yield 71 per cent over the check plots and the 0-8-16 increased the yield 86½ per cent.

FERTILIZER TEST ON ALFALFA

Treatment	Yield Dry Hay per A. 1929 Cutting lbs.
Check (Av. of 5 plots)	438.9 ***
525 lbs. 0-16-0	676.5 ***
" " 0-16-8	1,023.0 **
" " 0-16-16	1,864.0 *
" " 0-16-24	1,765.5 *
" " 0-16-30	2,054.2 *

*** Very Weedy
** Some Weeds
* Clean Clear Hay.

In the fall of 1928, after the summer growth on the above plots were showing such a response to potash, a portion of the seeding in the same field was top-dressed with muriate of potash at the rate of 200 pounds per acre. The following spring (1929), after leaving an adequate check, the re-

FERTILIZER TESTS ON SWEET CLOVER

Plot Number	Treatment	Yield Green Hay per A.
1, 3, 5, 7	Check Plot	Av. Yield 7,180.8 lbs.
2	350 lbs. 0-20-0	6,160.3 "
4	350 " Muriate of Potash	12,262.2 "
6	350 " 0-8-16	13,389.2 "

mainder of the seeding was top-dressed at the same rate and harrowed with a spike tooth drag, with the following results:

FALL VS. SPRING TOP-DRESSING WITH MURIATE OF POTASH AT THE RATE OF 200 LBS. PER A.

Treatment	Application	Yield Dry Hay per A. lbs.
Check	No Potash	1,293.6
Fall Application	200 lbs.	3,147.8
Spring "	200 lbs.	2,539.3

In the spring of 1929, another series of plots were established to determine if possible how much potash could be applied at a profit.

"HOW MUCH POTASH"

Treatment	2 Cuttings Dry Hay—lbs. per A.	Value	Profit Above Cost of Potash
Check (Av. of 3 plots)	1,100	$5.9[illegible]	
100 lbs. KCl	1,419	11.09	$5.47
150 " "	1,303.5	10.20	4.58
200 " "	1,443.5	11.16	5.54
250 " "	1,666	12.21	6.59
400 " "	2,086	15.19	9.57

The season of 1931 completes the tenth year that this farm has been managed under this particular program, which we call "The Keystone System of Sand Land Management." It is called the "Keystone" System for two reasons; first, because the keystone is the insignia of the Pennsylvania Railroad, and second, because the keystone is the emblem of stability and safety.

To the farmer engaged in farming these lighter soils, we believe that this system may be everything implied by the keystone, as in this system constantly have been considered the problems which face the operator of sandy soils; the conservation of moisture; the increase of humus content; and the building up of soil fertility while at the same time making a living.

The previous "Ten Years of Demonstration Work" was reviewed and the various fertilizer plots studied. The Keystone System of Sand Land Management was, so to speak, put upon the witness stand. It gave its testimony and then turned to the various fields of corn, rye and vetch, sweet clover seedings, alfalfa, and potatoes to substantiate its contentions.

Golden glow corn, receiving only 60 lbs. per acre of a 2-8-10 fertilizer, withstood the grilling test of the recent dry and extremely hot weather and looked good for 55 or 60 bushels of shelled corn per acre; the rye and vetch crop yielded more than 25 bushels per acre; sweet clover seeding in oats, 14 acres of it, was eligible to envy by any farmer on the best of soils.

Another demonstration which has proven the practicability of starting in a small way, but starting right, was the dairy herd. Started in 1924 from the one

(*Turn to page* 42)

This alfalfa was seeded with oats and peas and top-dressed the following spring with 200 pounds of muriate of potash per acre.

Testing Fertilizers *on* Oregon Berries

By M. E. McCollam

San Jose, California

BERRY growing is a well-established, intensive industry in Oregon. The use of fertilizer on berries to reduce production costs and to maintain fine quality in the fresh and canned product has been considered essential for a long time. However, fertilizer information of local value has been scarce and, in the case of cane berries, has been difficult to obtain because of the involved task of recording separate picking weights on different parts of the fields.

Oregon is showing a progressive attitude in this particular work, as she has shown in other agricultural matters, and has recognized the value of field test plots throughout the State. State College workers, berry growers, and fertilizer companies have been very much interested in applying the right kind of fertilizer information to this crop. As a result, a number of fertilizer tests have been located in berry-growing districts, and already these have yielded a valuable fund of information even though most of the work is in the early stage.

Two fertilizer tests on berries in Yamhill county, Oregon, being supervised by County Agent S. T. White, typify the interest in fertilizer work and the care with which records are being taken. Yield results on these tests for the 1931 season have been recorded as follows:

(*Turn to page* 54)

VIC REES, SPRINGBROOK, OREGON

Soil Type—Melbourne Silty Clay Loam

BLACKCAPS

Plot	Fertilizer Used	Yield Per Acre	Increase Over Check
1	Complete 3-10-10 (1,000 lbs. per acre)	6,592 lbs.	1,144 lbs.
2	Complete 3-5-10 (1,000 lbs. per acre)	6,880 lbs.	1,432 lbs.
3	Check (No Fertilizer)	5,448 lbs.	
4	Complete 3-10-5 (1,000 lbs. per acre)	6,088 lbs.	640 lbs.
5	Complete 3-5-5 (1,000 lbs. per acre)	5,504 lbs.	65 lbs.

INDIVIDUAL PICKING RECORDS—1/8 ACRE PLOTS

Picking	Plot 1 Lbs.	Plot 2 Lbs.	Plot 3 Lbs.	Plot 4 Lbs.	Plot 5 Lbs.
1	106	133	159	177	75
2	172	316	188	251	181
3	313	287	230	225	164
4	133	124	140	102	61
Total	824	860	681	761	688

John Jackson shows a part of his yield of 506 bushels of potatoes per acre.

Making the Club

By Ford S. Prince

Agronomist, New Hampshire College of Agriculture

FROM a small beginning with a half dozen entrants in 1926, New Hampshire's 300-Bushel Potato Club has grown to considerable size with 55 entrants in 1931, 34 of whom were successful in making the desired yield.

To John Jackson and Son, of Colebrook, N. H., goes the honor of producing the greatest yield, 506 bushels per acre. Not only was this the greatest yield for 1931, but it establishes a record for the six years of the club's operations.

Excellent potato practices coupled with favorable potato weather led the Jacksons into the forefront this year. Among the practices that they have learned annually to follow are the use of certified seed, fertilizing according to the latest recommendations, thorough spraying, and good weed and grass control.

This was the Jackson's third attempt in the club. In 1929 they made a yield of 362 bushels per acre; in 1930 they boosted their yield to 446 bushels; and this year the yield was lifted above the 500-bushel mark.

The 300-Bushel Potato Club in New Hampshire is operated by the Extension Service for the express purpose of finding out how the leading potato growers of the State produce good yields. These yields are checked at digging time on a three-acre tract by representatives of the Extension Service. Each grower is allowed to pick his best three-acre piece, if he knows

where it is. Records are taken on each grower's operations for the season at digging time.

The growers who enter the ranks of the club are in the business in a fairly big way, having grown 18 acres on the average during the past season. They are, of course, among the best growers, as indicated by their yields. The average of the 34 growers who made the club in 1931 was 376 bushels per acre, which is at least twice the average of the State as a whole. Ten of the 34 men made a yield of more than 400 bushels per acre with an average for the 10 of 445 bushels, while those whose yields ranged from 300-400 bushels averaged 345 bushels per acre.

Fertilizing Practices

Probably the most interesting point in connection with the operations of these men is their fertilizing practices.

The "upper ten," meaning those who averaged over 400 bushels, applied 2,550 pounds of fertilizer per acre, of 20-unit plant food, while the lower group used but 2,180, the average for the entire club being 2,280. This is 200 pounds more fertilizer than was used by the club growers in 1930, reflecting lower fertilizer prices and an effort on the part of the growers to have at all times an excess of fertilizer handy to the roots of the crop.

Multiple-strength fertilizers appear to be popular with the 1931 group. Eighteen growers used nothing but high-analysis goods, running from 30 to 60 units of plant food, while 15 used fertilizers averaging 20 units of plant food and one used a little of both types. No severe cases of burn were recorded. It seems that our potato growers are making an effort to cheapen their costs by using high-analysis material.

Eleven men broadcast part of their fertilizer, and one man applied all of his in that manner. Where more than a ton of fertilizer of a 5-8-7 grade or its equivalent is applied, the custom appears to be to broadcast or side-dress the extra quantity.

Twenty-three of the growers used certified seed, while the balance used seed only one, two, or three years from certification. While not all growers change their seed annually, it has become a general practice either to follow that method of having good seed or to hold certified seed not longer than over two years.

The average amount of seed used was 18 bushels per acre. This figure also represents an increase, there being a tendency to use a little more seed so as to get a better stand of spuds in the field. Narrowing up the rows and planting a little closer together in the row also make a greater draft on seed stock. This is the present tendency, farmers feeling that one year with another, the higher the yield, the lower their bushel costs will be.

Four growers in the club sprayed or dusted 10 times, the lowest number of applications being 4. The average for the entire group was 6½ applications. Twenty-five of the men sprayed, 7 dusted, and 2 growers resorted to both spraying and dusting.

Plowing Practices

Eighteen men plowed their land in the fall, while the remainder resorted to spring plowing. It is customary to plow sod land in the fall, and land which has been in a cultivated crop the year before in the spring.

Mr. Jackson, the club winner, plowed his land soon after haying and harrowed during the fall with a quack or witch-grass harrow to get control over that pest. He harrowed his land six times before planting, but cultivated only three times after the potatoes were planted. The average of the group harrowed but four times before planting and cultivated five times after planting.

Only two men report using a clover sod for their entire crop. One used land on which oats and peas had been

(*Turn to page* 50)

National *and* State Sweet Potato Champion

By

Chas. Kilpatrick

Camden, Arkansas

John, holding an exhibit of potatoes that won a championship.

DURING the past five years John D. Holley, Stigler, Oklahoma, has become a State and national figure in growing "quality" sweet potatoes. In this time he has exhibited and won the blue ribbon on his potato exhibit five times at his local county fair; four times at the Oklahoma Free State Fair, at Muskogee; once at the Oklahoma City Fair; and once at the Tulsa State Fair. In 1930 he carried off the honors at the National Hay, Grain, and Stock Show at Chicago. In 1931 he made two entries at Chicago, winning first and third places.

Showing the size of the prize potatoes.

How has this 4-H club boy been able to make this remarkable record? John says, "Good seed coupled with the right kind of fertilizer is the law for any crop."

Questioning John a bit further, we found that back of the good seed and fertilizer was some real hard work.

Continuing, John gives the real story of his success, "I laid off my rows May 10, putting in 500 pounds of 4-8-10 fertilizer per acre. I bedded with the lister and set the plants the same day. I gave the crop five cultivations."

The past year was very dry, which cut his yield to 180 bushels per acre. However, John said that he liked to use fertilizer because it made his crop two weeks earlier and made a brighter, smoother potato.

John modestly added that he has won first prizes on his irish potatoes exhibited at the county fair for the past five years, and in three out of five tries at the State Fairs.

Fertilizers Pay *in* West Tennessee

By C. T. Ames

For 25 years Director of the North Mississippi Experiment Station

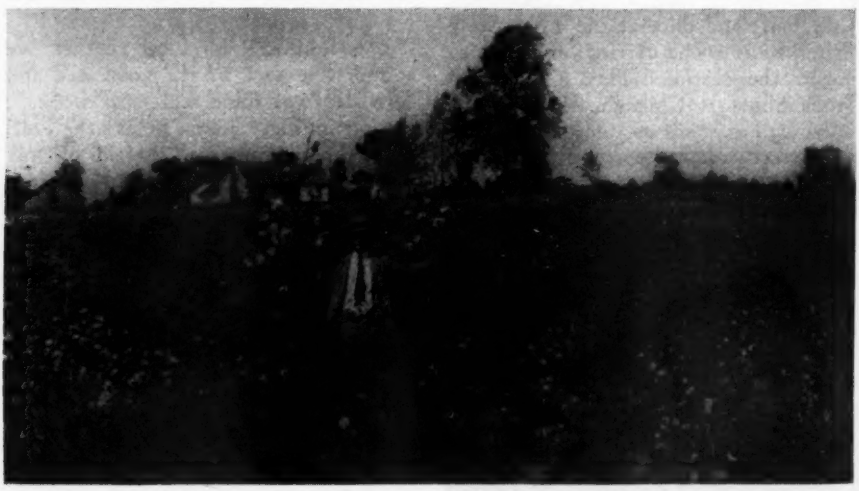
ONE of the most outstanding fertilizer demonstrations I have ever seen was conducted on the farm of J. S. Markamis and worked by E. L. Underwood, both of Ripley, Lauderdale county, Tennessee. This farm is located near the foothills of the Mississippi delta and for four years previous to 1931 this particular land had been planted to a combination of lespedeza and red top for forage.

In the spring of 1931 this soil was prepared and on one half of it muriate of potash was applied in the drills at the rate of 160 pounds per acre and bedded upon, the other half receiving no fertilizer. Both parts were planted to cotton in the usual way and on the same day.

As the heavy fruiting period approached in midsummer, it became evident that the half which had received no fertilizer was deteriorating badly as a result of rust, and this grew worse as the fruiting period advanced. On the other half, where the muriate of potash had been applied, very little rust appeared, and I believe that 200 pounds of muriate would have controlled it entirely, thereby still further increasing the yield.

But the weighed cotton from the two halves tells the story in a better

(*Turn to page* 50)



The Underwood demonstration near Ripley, Tennessee—The man in the foreground holds typical stalks of cotton from the two plots and stands near the division of the plots fertilized with and without potash. The final yields were: (reader's left) with potash, 1,512 pounds of seed cotton per acre; (right) without potash, 608 pounds per acre.

Grass taken from harvest areas of the Travinger Sisters pasture improvement demonstration at Thornville, Ohio. Left to right the treatments are check, phosphorus, and complete fertilizer.

Dairy Feed at 2¢ per lb. of Protein

By D. R. Dodd

Soils and Crops Specialist, Ohio State University

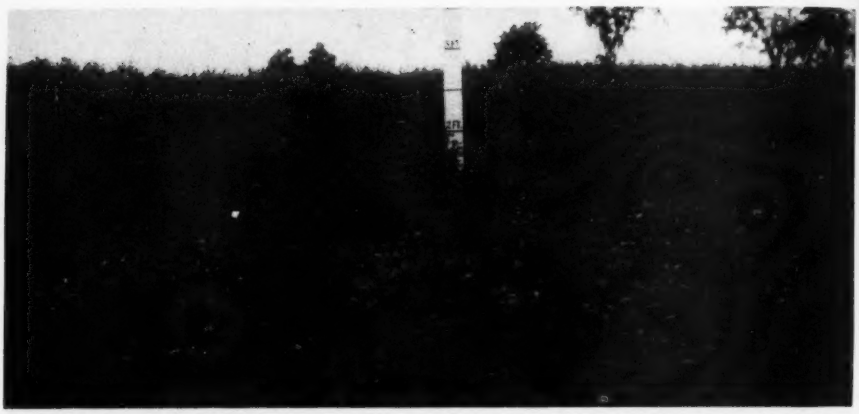
DAIRY feed at 2c per pound of protein sounds like very cheap dairy feed, but it was actually produced at a lower cost than that in 26 pasture improvement demonstrations in southeastern Ohio in 1931.

Now that the spring treatment of more than 50 such demonstrations for 1932 is completed, it seems a fitting time to reflect on the results of the year before. Pasture improvement demonstrations involving the use of lime and phosphorus have been in progress in Ohio for a number of years. During the past few years, experiment station work in Ohio, Wisconsin, Pennsylvania, and elsewhere has indicated that farmers might be overlooking a valuable investment in not making use of a complete fertilizer on pasture land. That is why the new type demonstrations including complete fertilizers were begun on a rather extensive scale in Ohio in 1931.

Since the pasture problem was more acute in the eastern part of Ohio and since the average dairyman of southeastern Ohio found it necessary to spend more than 20 per cent of his gross income for feed, the majority of these tests were located in that section of the State. It was obvious that the more of this feed bill the farmer might save, the better off he would be at the end of the year. It was also obvious to most farmers that good green pasture was more productive of milk than dry brown feed. Consequently great interest in the demonstrations was manifested from the start.

A single harvest was made from the

(*Turn to page* 52)



This shows the stand of Alfalfa on the lime-potash plot of G. B. Jackson & Son, Waterville, Maine, on August 11, 1931. The alfalfa is healthy and the stand is about 100% pure alfalfa.

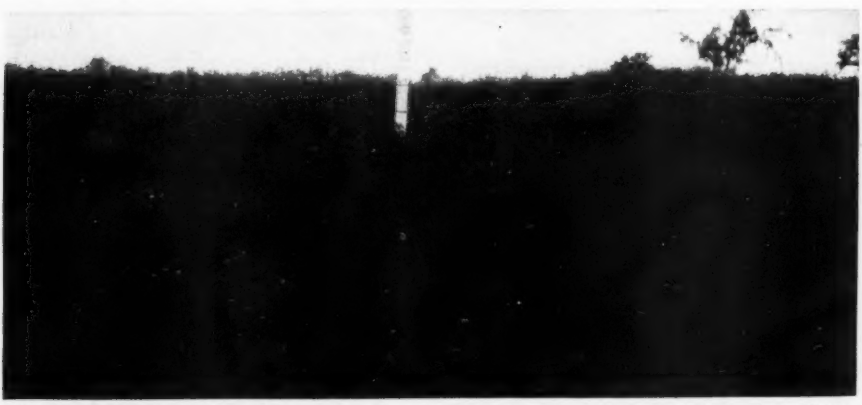
Alfalfa Longevity

By R. F. Thomas

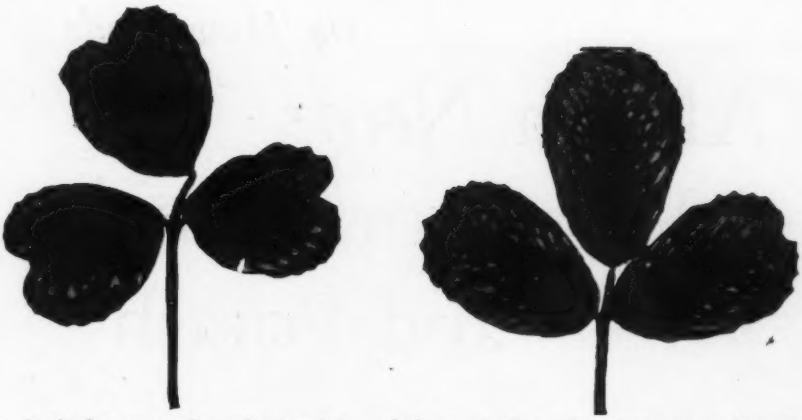
Houlton, Maine

A FERTILIZER test which has been carried on for the past three years on the farm of G. B. Jackson and Son, Waterville, Maine, shows that the yields and the length of life of alfalfa can be materially increased by the liberal use of phosphorus and potash. Of the three treatments used, the combination of phosphorus and potash was the best; potash alone was second; while phosphorus alone was the least effective treatment.

In 1928, the Jacksons applied liberal amounts of lime and manure to the field before seeding to alfalfa. Then 500 pounds of superphosphate were



This shows the lime-phosphorus plot on the same day. There is not more than a 30% stand of alfalfa, and potash starvation symptoms are very evident on the foliage. Note the thinness of stand.



Left: In the first stages of potash starvation, regularly spaced white spots appear around the borders of the older leaves. Right: Later the borders of the leaves turn yellow, dry up, and curl.

applied just before seeding. Three eighth-acre plots were laid off and given the following additional treatments: Plot 1, 500 pounds of superphosphate; Plot 2, 400 pounds muriate of potash; Plot 3, 500 pounds superphosphate plus 400 pounds muriate of potash.

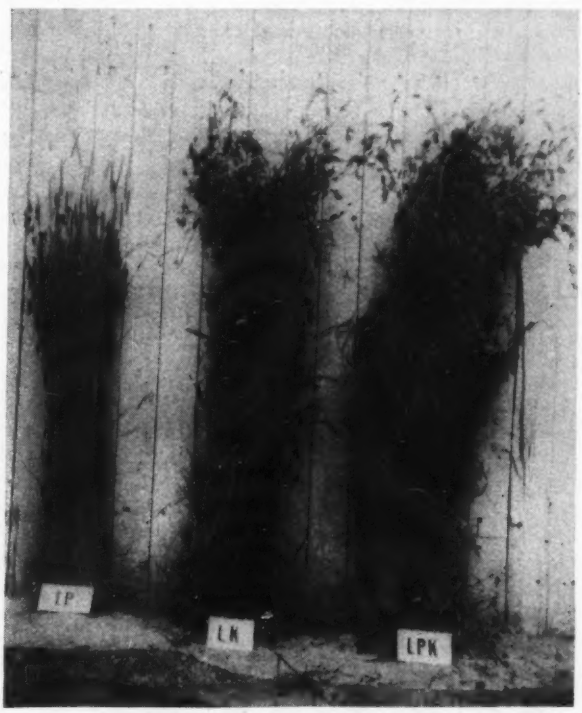
The first year the plot getting the extra phosphorus gave the best yield, showing that the manure was supplying the potash the alfalfa needed.

In April, 1930, additional fertilizer was applied as follows: Plot 1, 500 pounds superphosphate per acre; Plot 2, 200 pounds muriate of potash; Plot 3, 500 superphosphate and 200 muriate of potash. No further fertilizer treatments have been given, but the yields from these plots were secured each year.

The yields per acre of cured hay from the first cuttings of the differently treated plots, in tons per acre, were as follows:

Year	*Phosphorus*	*Potash*	*Both*
1929	3.16	2.78	2.64
1930	2.58	3.32	3.42
1931	2.26	3.33	3.94
Total	8.00	9.43	10.00

(*Turn to page 55*)



Yield per Acre—Air Dry Weight

4,538 lbs. 6,635 lbs. 7,865 lbs.

On Heavy Soils

Alfalfa *Needs* Phosphoric Acid and Potash

By R. L. Cook

Soils Department, Michigan State College

WHEN a field is left in continuous production of alfalfa, large quantities of phosphorus and potassium are removed from the soil and after a period of years, a depletion of these elements is inevitable. This is contrary to the general idea of most farmers who look upon alfalfa as a soil builder and who assume therefore that the longer a field grows alfalfa, the more fertile it will be. It is true that the percentage of organic matter and nitrogen of the soil may be increased, but the phosphorus and potassium content necessarily must be decreased. Where, aside from the soil, could the phosphorus and potassium in the harvested crop come from?

Giving due consideration to these facts, it is only logical to assume that applications of phosphorus and potash to the soil would be beneficial to the alfalfa crop. Experiments on different types of heavy soil show this to be true.

Fertilize Grain Crop

In the heavy soil areas of Michigan, alfalfa is raised in a regular rotation. This is especially true on the most up-to-date farms. It is easier to get a seeding on these soils than it is on the sandy soils in other parts of the State. As a result, the seeding is usually done with a nurse crop. Wheat and barley are most often used as nurse crops, although good results are sometimes obtained from seedings with oats. If oats are to be used, the rate of seeding should not exceed two-thirds of the usual rate. Where alfalfa is seeded in this way, it is essential to bear in mind that fertilizer applied with the grain may also be beneficial to the following hay crop.

What Fertilizers for Rotation?

Experiments have been conducted on a number of farms in an endeavor to determine just what fertilizers may be most profitable over a complete rotation. One such experiment has been in progress since 1926 on the farm of Lee Ferden near Chesaning, Michigan. This soil, A Brookston clay loam, has a very dark gray, friable, silty clay loam surface layer extending to a depth of about seven inches. It is well drained and not in need of lime. The fertilizer has all been applied by hand a few days before seeding and as a general rule twice during the four-year rotation. The plan has been to apply all the fertilizers with the corn and wheat and only nitrogen fertilizer with oats or barley.

(*Turn to page* 57)

SPRING FEVER

PICTORIAL

Such is the fulness of my heart's content.

—*Shakespeare*

Above: Made from the air, this unusual view shows the American Falls at Niagara, New York.

Below: Through twilight mists and from an altitude of 2,500 feet, New York, looking south from 59th Street toward the Bay and the Narrows, looks like this.

Publishers Photo Service, N. Y.

Above: In marked contrast to the American way of allowing animals to roam at will in pasture, the herdsman on the Island of Guernsey tethers his charges to long chains, moving the stakes several feet every few hours. By this method little food is trampled and wasted.

Below: Cat-tails, calamus, sagittaria, water lilies, swamp grasses, duckweed, and green scum, such as are pictured in this scene near South Bend, Indiana, gradually build up a muck soil. The famous mint fields were once geographical features such as this.

Nought cared this body for wind or weather
When youth and I lived in't together.

—*Coleridge.*

Above: The first turn-out. One of the delights in turning the herd out for the first time in the spring is to see their pleasure in exploring their old haunts before settling down to serious grazing.

Left: The old covered bridge. Who does not remember the deafening clatter of crossing it in horse-drawn vehicles? Along with horse-drawn pleasure vehicles, the old covered bridges are being relegated to the past.

The Editors Talk

Washington's Soil Fertility Council

The State of Washington has stepped out into the front ranks of soil fertility activities by creating a soil fertility council sponsored by its State Chamber of Commerce. The council as organized is composed of individuals who recognize the vital importance of soil fertility and who are directly concerned with the classification of agricultural lands and maintenance of the productive power of these lands. Represented on the body are the State College, farmers' organizations, individual farmers, vocational agriculture, fertilizer companies, agricultural departments of railroads and banks, and the agricultural press.

Prior to the organization of the council the Washington State Chamber of Commerce had this to say regarding the purpose of the move:

> "Through our numerous contacts in this work we have become convinced that the maintenance of soil fertility is the State's Basic agricultural problem. We recognize the soundness of the position taken by many of our agricultural and industrial leaders when they point out that a more far-reaching fertility program is prerequisite to permanent and profitable agriculture.
>
> "Soil investigational work now in progress by public and private agencies, chief among which are our experiment stations, is of unquestioned value. However, the extreme complexity of the program, due to the great variety of conditions that must be met, coupled with the limitations placed on agencies charged with the work, make the problem one demanding thoughtful consideration if the future of our agriculture is to be properly safeguarded.
>
> "In view of the situation as outlined above, this organization is calling together a few of those who have been most active in this work, to meet for the purpose of giving consideration to what may be done at this time in the way of developing a more comprehensive State-wide soil fertility program."

At the first meeting of the council on February 15, it was decided to undertake the task of considering all available results from fertilizer test plot work which has been carried on and to formulate fertilizer recommendations for various crops on various soil types throughout the State. A committee of the council was appointed to do this piece of work and after considering and discussing a large mass of experimental data a set of soil management and fertilizer recommendations was submitted to the council. This set of recommendations was later adopted and will be given wide distribution in agricultural communities of the State by the farm press, State College, and other agencies.

Unquestionably a large service was rendered the farmers of the State in this one meeting by the compilation of soil management and fertilizer data and the presentation of a set of recommendations based on the best available recommendations.

Another committee of the council is giving consideration to the classifica-

tion of the State's agricultural land. Many important functions of the council will undoubtedly be established as its activity grows.

The State of Washington now has its soil fertility interest concentrated in one body. The vital considerations are that attention will be focused on a great State asset, a coordinated soil program will be easier of accomplishment, dissension will be minimized, and points of agreement found whereby a soil fertility program can be effectively furthered. Confidence will be established in the mind of the farmer, who is the ultimate beneficiary, where before there was a great deal of confusion and perhaps misgiving.

Washington should be congratulated on its Chamber of Commerce and the spirit of the men interested in its soil welfare.

Fertilizer and the State

To what extent, if any at all, should the State aid the farmer in the purchase of his fertilizers is a question regarding which there can be a great difference of opinion. Whatever the answer, it is interesting to observe that the depression in the sale of fertilizers is not by any means confined to our own country, but is more or less the condition in countries abroad.

The sale of smaller quantities of fertilizer raises the question, not only of helping the farmer, but of maintaining one of the greatest national assets—the fertility of the land. Evidently for this reason, in addition to assisting the farmer in difficult times, arrangements were made through the offices of the Agricultural Bank last spring in Western Australia, for the purchase of fertilizer materials to top-dress pastures. The Victorian Minister of Lands also arranged for the supply of superphosphates to farmers on the basis of a government financial guarantee. New Zealand solved the difficulty by the purchase of fertilizers through the Rural Intermediate Credit Board.

Coming nearer home, the government of the Province of Quebec has made arrangements to allow farmers a rebate of so much per pound on the purchase of nitrogen, phosphates, and potash. Undoubtedly, there are other instances in countries abroad.

Whether this is the proper way to stimulate the use of fertilizers or not, such government systems, as the "Fertilizer, Feeding Stuffs, and Farm Supplies Journal" points out, serve to emphasize the very necessary and indispensable character of the fertilizer industry and the importance of maintaining the fertility of our farm lands at a productive level.

Fifty Years of Service

We wish to congratulate the Ohio Agricultural Experiment Station, which on April 17 celebrated its fiftieth anniversary. The fifth "child" in the great family of agricultural experiment stations in the United States, the Ohio Station came into being at the Ohio State University in Columbus in 1882. Ten years later it was moved to its present location at Wooster in Wayne county.

A very interesting article by C. G. Williams, present director of the Station, appearing in the April 16 issue of the *Ohio Farmer*, sums up a few of the many important contributions to agriculture during the fifty years of this Station's service. In our August, 1929, issue of BETTER CROPS WITH PLANT FOOD we had the pleasure of presenting a history of the Station written by W. K. Greenbank, editor of the Station. Scanning the two articles for a quick summary of the important soil fertility work done, we wish to call to the attention of our readers that the "Ohio Station was perhaps the first to discover the great need of corn belt soils for phosphorus and the inevitable deficiency of manure in this element. . . . Later the growing need for nitrogen and potassium was recognized and emphasized."

Director Williams states: "The response of the farmers of the State to the published results of Station work is shown by the rapidity with which they have changed their methods of fertilizing corn. Ten years ago very little corn was fertilized in the hill or row. Following the work of the Station there has been a marked change. A survey made in 1929 showed that 54% of the corn acreage of the State was fertilized and 90% of all farmers using fertilizer put a part or all of it in the hill or row. The Station's experiments in the placement of fertilizer have resulted in changes in most of the leading makes of corn planters to conform to the methods of distributing fertilizer found to be most desirable, namely, in lateral bands."

Editor Greenbank in his article points out that C. E. Thorne, Director of the Station from 1887 to 1921, in starting the work at Wooster recognized the importance of planning field experiments to continue indefinitely and to answer fundamental problems. For more than a third of a century the five-year rotation has been revealing valuable information and the end is not yet. In this experiment the three fertilizer elements are still used separately, in four possible combinations, and in different carriers as started on 150 tenth-acre plots in 1893. A single rotation showed phosphorus to be the first limiting element on the Wooster soil. After 25 years, potash became of first importance for corn but not for other grain crops.

Director Williams in the true spirit of the purpose of agricultural experiment stations after reviewing a long list of contributions, states: "There are, of course, many important problems yet awaiting solution" and then names several of the problems under consideration. "All of these things," he says, "not for a greater total production, but for greater economy in production."

To commemorate its fiftieth anniversary, the Station has in press an index covering its publications for its entire existence. This index has been prepared by Dr. C. E. Thorne who has been connected with the Station almost from its very beginning.

Intentions to Plant

Some people regard intentions-to-plant reports a bit dubiously. Perhaps they feel that farmers as a whole act about like Frank and Charley, subjects of an amusing little editorial with a point which appeared some years ago in "Farm Life." The story runs:

"The late April freeze killed our apples. The rains kept us from getting our corn and soybeans planted in time. One batch of baby chicks got chilled and most of them died. Other troubles might be reported, but

life on our farm is not without interest, because we have Frank and Charley. They are four-year-old mules, rather on the smallish size, but funnier than clowns. Good workers they are, gentle and affectionate, and as human as only mules can be. Frank is round-headed, steady, obstinate. Charley is inclined to prance. They'll work all day, roll over twice when the harness is removed, and then play around the lot like puppies. Earl, their master and friend, talks to them continuously. They lean a wise ear over in his direction, and listen; then they do pretty much as they please, like the rest of us."

Research economists responsible for issuing intentions-to-plant reports have always acknowledged the difficulty of getting data and have stressed the point that these data can only be estimates. While harvested acreages do not always coincide with intentions, the fact remains that reports of anticipated plantings in the greatest number of cases have furnished valuable information to growers and agricultural industries.

In this year's reports a significant trend is seen. It is evident that farmers are reducing acreages of those crops that are selling at low prices or that necessitate heavy cash expenses and they are increasing crops needed on their own farms for food or feed. This indicates a growing determination on the part of the farmer to be as nearly self-sustaining as possible, which undoubtedly is an important move toward readjusting agriculture in our economic picture.

Beans Is Beans

Almost all of us remember Ellis Parker Butler's well-known story "Pigs is Pigs." Last December we saw a sight which suggested a similar title, "Beans is Beans"—95,000 bushels of soybeans—Mammoth Yellow, Laredo, Otootan, and other varieties which were raised on one farm. We haven't figured just how far these beans would reach if placed end on end, but as Amos n' Andy would say, there was "a mess" of beans.

The beans were raised on a drained portion of a lake of some 50,000 acres just inland in North Carolina from Pamlico Sound. It is owned by August Heckscher of New York City and worked by an operating company known as the New Holland Corporation, of which Fred Latham of Belhaven, North Carolina, is the capable manager.

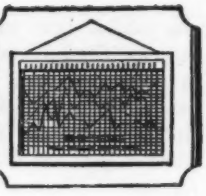
Dikes have been thrown around a portion of the lake and powerful pumps capable of removing more than a million gallons of water per minute to keep this portion of the farm in arable condition. An area of some 9,000 acres was planted to soybeans in 1931 and a total production of 95,000 bushels was harvested, with thousands of bushels being lost because of bad weather, due to smoke pall from burning woods and continued fog during the harvesting season. The beans were to be crushed for oil.

As can well be imagined, this is no ordinary farm, but one which has been industrialized. Accurate records are kept of every field in terms of gasoline, cylinder, oil, man power, and machine power. Mr. Latham knows exactly the costs of production of each crop unit.

Like every good farmer, Mr. Latham, who is the originator and breeder of the famous Latham corn, practices diversification. A test field of 100 acres was seeded to rice last year and so successful was the crop that plans were made to greatly increase the acreage in 1932.

If accurate cost of production accounts and diversification are so essential in large scale farming, why aren't they just as important on smaller farms?

AGRICULTURAL DEVELOPMENTS



UNITED STATES TESTS MANCHURIAN SOYBEANS

Manchurian soybeans, the chief crop of the Asiatic region for which they are named, are to be given thorough trial in 12 States this year, the United States Department of Agriculture says.

The beans, more than 3,000 varieties of them, were gathered by W. J. Morse of the department, in a 2-year Asiatic plant expedition. Last year the seeds were grown on the Arlington Experiment Farm in Virginia, and this year the varieties will be sent to experiment stations in different regions of the United States to test them under conditions most nearly like those in Manchuria, Japan, Korea, and Formosa, where they grow naturally. The soybeans vary from those which ripen in 78 days to those which require 173 or more days to ripen.

The States to which the beans will be sent for planting this year are: Ohio, Iowa, Illinois, Missouri, Mississippi, South Carolina, North Carolina, Louisiana, Wisconsin, New York, Indiana, and Massachusetts.

Soybean production has increased rapidly in the United States in the last few years. In 1929, it was estimated that 886,000 acres were harvested, while in 1931 this figure had jumped to 1,271,000 acres.

A FARM-MANAGEMENT ASSOCIATION

In order to get a more definite check on their business, farmers in four counties of eastern Iowa have organized a farm-management association, reports Iowa State College. Most of the farmers in the association have been enrolled in the farm-accounting project sponsored by the local farm bureaus in cooperation with the Iowa Extension Service. J. J. Wallace, Iowa State Extension Specialist in Farm Management for the last year, who has had eight years' practical farm experience and five years' experience as county agent in Osceola county, Iowa, is the association's farm-management adviser. He will work with association members in much the same way a county agent works with farm-bureau members, except that he will give his time to farm management entirely.—*U. S. D. A., Official Record.*

SHOWS CORN BELT FARMS HOW TO INCREASE INCOMES

From $100 to $500 a year could be added to the net income of most corn belt farms by changing the cropping system to include more of the crops that pay relatively high net returns per acre, according to M. L. Mosher, farm organization and management department, Illinois College of Agriculture. An analysis of records from hundreds of central Illinois farms, Mr. Mosher says, shows that next to crop yields and livestock efficiency, the proportion of tillable land in the more profitable crops often is the most important factor leading to differences in net incomes between farms.

Most Illinois corn belt farms keep only 50 to 60 per cent of the tillable land in corn, alfalfa, and sweet clover, and from 30 to 40 per cent in small grain, timothy, and bluegrass. Miscellaneous other crops occupy 10 to 15 per cent of the land. A change to a system providing for from 60 to 70 per cent in corn, alfalfa, and sweet clover, and only 20 to 30 per cent of

the tillable land in small grain would increase the income of a farm as much as $500 in some cases with average prices, depending on present yields and the size of the farm, according to Mosher.—*U. S. D. A. Marketing Activities.*

FIND NEW USES FOR AMERICAN COTTON

Evidence of increasing consumption of American cotton in the form of clothing and new industrial fabrics was presented at a meeting, February 3, of the New Uses for Cotton Committee, composed of members of the U. S. Department of Agriculture, U. S. Department of Commerce, and the Cotton Textile Institute, Inc.

Cotton, it is expected, will play a leading role in this year's spring styles, the committee was told, as indicated by advance showings at Paris, Palm Beach, and New York. Cottons of new texture and weave are to be featured in sportswear, tailored dresses, formal afternoon and evening gowns, and women's costume accessories.

Other new uses include a suitable cotton fabric for curing concrete; increased use of consumer cotton bags in the retail packaging of potatoes, nuts, citrus fruits, onions, and apples; a cotton foundation material in the home manufacture of hooked rugs; and progress in the development of a low-priced cotton fabric for use as a cotton bale cover.—*U. S. D. A. Marketing Activities.*

EAT MORE MEAT

Per capita consumption of meat in the United States averages a little more than one-third of a pound a day, reports the Bureau of Agricultural Economics. Total per capita consumption of meats last year was 133.2 pounds, an increase of about one-half pound over 1930. Per capita consumption of various meats for 1931 were: pork, 69.6; beef, 49.6; veal, 6.9; lamb and mutton, 7.1.

BILLION ACRES SURVEYED

Nearly a billion acres of farm lands in the United States have been mapped by soil surveyors of the United States Department of Agriculture. This area is greater than the combined area of European Germany, France, and Great Britain. The work is now progressing at the rate of more than 15,000,000 acres each year, and department officials estimate that between 20 and 30 years will be required to complete the survey. The cost of this work is between 2 and 3 cents an acre.

VALUABLE HONEYBEES

Honeybees are so helpful in cross pollinating fruit trees that in many sections they are kept for this purpose rather than for the production of honey. State bee specialists say that in Oregon, which is a good honey State, it has been estimated that bees are from four to five times more valuable to fruit growers than to beekeepers.

Keystone System

(*From page* 21)

old purebred Guernsey cow and a purebred bull, the herd today consists of 14 head with an average butterfat production of 364.3 lbs. Purebred Duroc Jersey hogs and white leghorn chickens constitute the rest of the livestock on the farm.

As a vindication that this kind of a program is practical, the resident farm foreman for the past five years on September 1 took over the farm as a private enterprise. He believes in the Keystone System, the conservation of soil moisture, a sweet soil, legumes, a definite crop rotation, all this supplemented by the "efficient use of commercial fertilizer." Hence these 10 years of demonstration work will still stand in the community, operated not by the Pennsylvania Railroad, but by a private individual with private initiative and on private capital.

Research on Potash

AN industry in order to grow or even to exist must be based on sound fundamental principles in each of its parts. The processes of almost any industry may be grouped under the three general heads of production, distribution, and utilization. If any one of these three groups is not functioning properly, the whole industry suffers.

The problems of production are those which must first be dealt with and are the most obvious. Industry in general has recognized this and by means of research has solved its problems on a sound basis. Problems of distribution are also fairly obvious, and while perhaps not as satisfactorily solved as those of production, have nevertheless received a good share of attention.

Problems in connection with the utilization of the product, however, often have been neglected by industry. Too often industry has felt it was solving the problems of utilization by sweeping and superlative statements concerning its products without investigating the basic factors upon which utilization rested.

The fallacy of such a course is evident upon a little thought. In order to increase the use of its product, an industry must know the factors gov-

A group of American professors inspect the Agricultural Experiment Station of the Deutsches Kalisyndikat at Berlin, Germany

erning the use of the product, where and under what conditions the product can be used to best advantage by the consumer, and a host of direct and indirect factors concerned with the use of the product. The answers to these questions are not to be picked out of the air. They must be based on just as sound principles as are the answers to the problems of production and distribution, and they must be solved by the industry itself if it is to develop to the greatest possible extent.

Potash Experiment Station

The potash industry almost from its inception has recognized the importance of having its product used so as to bring the greatest possible profit to the consumer. It has fostered much investigation and research in many parts of the world to determine how and when potash can be used to the greatest advantage. This policy has not been confined to any one company, but has been followed by the industry as a whole, especially as constituted in Germany and France. In line with this policy and in order to conduct special research work on some of the problems concerning the use of potash fertilizers, the German Potash Syndicate established an Agricultural Experiment Station in the Lichterfelde section of Berlin in 1929.

The work this Experiment Station is doing and the results so far obtained have recently been published as a book entitled "Arbeiten Ueber Kaliduengung" by Prof. Dr. Dr. h.c. O. Eckstein, Dr. A. Jacob and Dr. F. Alten."* The book shows how thoroughly the industry is attempting to solve the practical problems concerned with the utilization of its product.

The purpose of the Experiment Station and reasons for its founding constitute the introduction to the book. The physical plant of the Station is then described in detail and one cannot help but admire the thoroughness and ingenuity with which it has been equipped. The facilities for controlling the air, humidity, and temperature of the laboratories and glass houses and the equipment for conducting pot tests are especially noteworthy. A section is devoted to a detailed description and study of the soil on which the Experiment Station is located.

Many Problems Studied

The main body of the book is devoted to the problems being investigated at the Station. These are divided into 10 groups or types of work as follows:

(1) Laboratory investigation of soils with particular reference to tropical soils;

(2) Comparison of various methods for the determination of the potash in the soil available to plants;

(3) Investigations on the amount and form of potash in the plant;

(4) The influence of potash on the properties of crops;

(5) Potash salts as protective agents against diseases;

(6) The physiological reaction of potash salts;

(7) The fertilizing action of the anions and secondary ingredients of potash salts;

(8) Examination of the fertilizing action of various fertilizers containing potash and magnesium;

(9) Determination of the possibilities of mixing various commercial fertilizers;

(10) Investigation on the significance of potash for animals.

The description of the work being done under these heads and the results obtained, are of value to those specializing in these subjects and of interest to all connected with fertilizer investigation and usage.

* "Arbeiten Ueber Kaliduengung" by Prof. Dr. Dr. h. c. O. Eckstein, Dr. A. Jacob and Dr. F. Alten, Landwirtschaftliche Versuchsstation, Berlin-Lichterfelde, 235 pages. 72 illustrations, price 6 Reichs Marks, Verlagsgesellschaft fuer Ackerbau M. B. H., Berlin S/Wll, 1931.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, and Crops. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

At the fiftieth anniversary of the Jordan soil fertility plots at the Pennsylvania Agricultural Experiment Station last summer, a number of eminent scientists gave short talks on work carried on by themselves and others at this and other experiment stations. These talks have now been published as Bulletin 273 of the experiment station and form an interesting and highly instructive collection of information on soil fertility. Professor A. L. Patrick described the soil on which the Jordan plots are located and Professor C. F. Marbut showed the relationship and importance of this soil in the agriculture of the United States.

Professor F. D. Gardner then discussed the economic returns from the fertilizer treatments of the plots. In this he brought out that phosphoric acid is the first limiting element in this soil; that potash was used with profit when applied in addition to phosphoric acid, and also when applied in addition to nitrogen and phosphric acid; and that nitrogen was the least important element on this soil. A complete fertilizer with lime was as effective in maintaining yields as manure. Dr. C. E. Thorne during his discussion of the results brought out by Professor Gardner showed that hasty conclusions should not be drawn from short field trials if serious errors are to be avoided. He also brought out that soils change in their fertilizer requirements as they grow older. As an example, he quoted from the Ohio Agricultural Experiment Station results showing that during the first 12 years of the experimental plots there, phosphoric acid was the most important element in the fertilizer for all crops grown. However, since that time potash has been becoming more important to the crops and has now been shown to be the most important element in the fertilizer for potatoes and corn. Without long-time experiments these shifts and changes in the soil might not be recognized for years after they develop.

Professor C. D. Jeffries presented a preliminary report on work he is conducting on the relationship between nitrification in the soil and crop production. This was supplemented by a discussion of the problem by Professor A. B. Beaumont. Professor S. W. Fletcher, Director H. J. Patterson, and Professor E. H. Hess gave interesting short reviews of the history of the Jordan plots. The significance of carbon dioxide production in the variously treated plots was considered by Professor F. J. Holben and discussed by Dr. S. A. Waksman. Professor F. G. Merkel showed the influence of fertilizer treatments on the exchangeable bases in the soils of the various plots and Dr. R. Bradfield discussed this from the viewpoint of general basic replacement in soils. Problems of the nitrogen balance in soils were presented by Professor J. W. White, supplemented with a discussion by Dr. J. A. Bizzell. The absorption of nitro-

gen, phosphoric acid, and potash by plants was then discussed by Dr. W. Thomas and also by Professor E. Truog. The influence of phosphates on crop yields and maturity was shown by Dr. C. F. Noll, and Professor S. D. Conner discussed this on the basis of Indiana conditions. Abstracts of interesting talks by Dr. H. G. Knight and Director J. G. Lipman are also included.

Latest recommendations of the Michigan Agricultural Experiment Station for the use of fertilizers for important crops in that State on various soils and under three systems of soil management have been published in Circular Bulletin 53, Revised, of that Station by C. E. Millar, G. M. Grantham, and P. M. Harmer, entitled "Fertilizer Recommendations for 1932." The recommended fertilizer analyses are given in such a way as to enable the farmer easily to determine which analysis is best for his conditions. In addition to fertilizer analyses, short and practical hints are given on the use of fertilizers, amounts, and methods of application.

Growers of market garden crops will be interested in Illinois Agricultural Experiment Station Bulletin 377, "Fertilizer Experiments with Ten Market-Garden Crops in Cook County, Illinois," by J. W. Lloyd and E. P. Lewis. Results of several years' experiments with the crops variously fertilized are given and conclusions drawn as to the fertilizer requirements of these crops on this soil. The data show that satisfactory yields could be obtained without any manure, when complete fertilizers were used. In many cases the highest yields were obtained with the complete fertilizer without manure. A small quantity of manure supplemented by the complete fertilizer was superior to larger amounts of manure alone. This bulletin brings added proof that careful soil management and the use of a well-balanced complete fertilizer can solve the problem of the continually decreasing manure supply.

"Fertilizer Recommendations," Univ. of Del., Newark, Del., Information Card No. 11, Feb., 1932.

"Quarterly Bulletin—Fertilizer Report," St. Bd. of Agr., Dover, Del., Vol. 21, No. 4, Dec. 31, 1931.

"Annual Report of the State Chemist of Florida for the Year Ending December 31, 1931," Dept. of Agr., Tallahassee, Fla., Quar. Bul., Vol. 41, No. 1, Jan. 1, 1932, J. J. Taylor.

"A Study of Ammonia and Nitrate Nitrogen for Cotton," Ga. Exp. Sta., Experiment, Ga., Bul. 169, Dec., 1931, K. T. Holley, T. A. Pickett, and T. G. Dulin.

"Commercial Fertilizers, Commercial Feeds, and Agricultural Liming Materials," Univ. of Md., College Park, Md., Control Series, No. 142, Jan., 1932.

"Inspection of Commercial Fertilizers," Agr. Exp. Sta., Amherst, Mass., Control Series, Bul. 60, Dec., 1931, H. D. Haskins.

"Inspection of Agricultural Lime Products," Agr. Exp. Sta., Amherst, Mass., Control Series, Bul. 61, Dec., 1931, H. D. Haskins and H. R. DeRose.

"Analyses of Commercial Fertilizers, Fertilizer Supplies, and Home Mixtures for 1931," Agr. Exp. Sta., New Brunswick, N. J., Bul. 533, Nov., 1931, Charles S. Cathcart.

"Garden Fertilizers," Agr. Exp. Sta., New Brunswick, N. J., Ext. Bul. 92, Nov., 1931, H. R. Cox.

"Second Annual Fertilizer Report," New Mexico Feed & Fert. Control Office, State College, N. M., Mar. 1, 1932, F. E. Oakes.

"The Response of Apples, Cherries, and Roses to Fertilizer Applications in the Nursery," Agr. Exp. Sta., Geneva, N. Y., Bul. 599, Nov., 1931, H. B. Tukey and Karl D. Brase.

"The Bulletin, I. Analyses of Fertilizers, Spring Season 1931, II. Analysis of Cottonseed Meal," Dept. of Agr., Raleigh, N. C., Dec., 1931.

"Tomato Varieties and Fertilizers for the Lower Rio Grande Valley of Texas," Agr. Exp. Sta., College Sta., Tex., Bul. 438, Nov., 1931, W. H. Friend.

"Truck Crop Investigations—The Effects of Heavy Applications of Phosphorus on the Inter-Relation of Soil Reaction, Growth, and Partial Chemical Composition of Lettuce, Beets, Carrots, and Snap Beans," Truck Exp. Sta., Norfolk, Va., Bul. 73, Oct., 1, 1930, H. H. Zimmerly.

"Commercial Fertilizers," Agr. Exp. Sta., Burlington, Vt., Bul. 334, Sept. 1931, L. S. Walker and E. F. Boyce.

"Home Mixing of Fertilizers," U. S. D. A., Washington, D. C., Leaflet No. 70, Rev., Jan., 1932, C. C. Fletcher.

"Conservation of Fertilizer Materials from Minor Sources," U. S. D. A., Washington, D. C., Misc. Pub. 136, Jan., 1932, C. C. Fletcher.

Soils

Owing to its importance to the farmer, the question of how fine limestone should be ground in order to be most effective has been investigated by several workers. The problem resolves itself into finding the happy medium, since coarsely ground stones are known to be ineffective, while very finely ground limestone is expensive. An excellent investigation of this problem is reported by T. L. Lyon in Bulletin 531 of Cornell University Agricultural Experiment Station, "Relative Effectiveness of Limestone Particles of Different Sizes." In this he summarizes the results of 10 years' experiments in which limestone was applied at three different rates to an acid soil. The stone was sieved so as to separate it into various sizes and the proper amount of ground stone of a uniform size was applied. The sizes used were 5-10 mesh to the inch, 10-25 mesh, 50-80 mesh, and less than 200 mesh. The results in terms of crop yield show that the coarsest stone was the least effective. It was especially poor the first few years, after which it produced somewhat better results, but it was never as good as the finer grades.

The best yields the first few years were produced by the finest ground stone, but as the experiment continued, the intermediately fine limestone pulled ahead. The average results for the whole experiment show that the 50-80 mesh stone produced the highest yields at each rate of application. The 10-25 mesh stone was second and not far behind the 50-80 mesh, while the stone less than 200 mesh was a close third.

Taking into consideration the expense of grinding, Dr. Lyon concludes that if the stone is ground so that all of it will pass a 10 mesh sieve, it will be sufficiently fine to meet practical needs. A stone ground in this way would have a moderate grinding expense and would contain a range of fine to medium sized particles with none of them over what might be called the effective size.

The author reviews the work of several other investigators and the results show some variation. The data indicate that the stone used had to be ground finer in some cases than in others to produce comparatively equal results. It would thus appear that the limestone should be ground finer under some conditions than under others. These conditions are not known, but Dr. Lyon suggests that the hardness of the stone may be of importance, the harder stones possibly needing finer grinding than the softer stones to produce equal results.

"Soils of Chouteau County, Montana," Agr. Exp. Sta., Bozeman, Mont., Bul. 252, Oct., 1931, L. F. Gieseker.

"The Management of Nebraska Soils," Univ. of Neb., Lincoln, Neb., Ext. Cir. 133, Sept., 1931, P. H. Stewart and D. L. Gross.

"A Study of Methods for the Preparation of Permanent Soil Profiles," Agr. Exp. Sta., Stillwater, Okla., Bul. 201, Jan., 1932, Horace J. Harper.

"Relations of Buffer Capacity for Acids to Basicity and Exchangeable Bases of the Soil," Agr. Exp. Sta., College Station, Tex., Bul. 442, Mar., 1932, G. S. Fraps, and J. F. Fudge.

"Chemical Composition of Soils of Northwest and West Central Texas," Agr. Exp. Sta., College Station, Tex., Bul. 443, Mar., 1932, G. S. Fraps.

"Boron in Irrigation Waters," U. S. D. A., Washington, D. C., Tech. Bul. 264, Nov., 1931, Carl S. Scofield and L. V. Wilcox.

"Soil Survey of the Fort Collins Area, Colorado," U. S. D. A., Washington, D. C., Series 1927, No. 27, A. T. Sweet and J. N. Spencer.

"Soil Survey of Cook County, Georgia." U. S. D. A., Washington, D. C., Series 1928, No. 11, J. W. Moon and A. L. Gray.

"Soil Survey of Miami County, Indiana, Part 1," and "The Management of Miami County Soils, Part 2," U. S. D. A., Washington, D. C., Series 1927, No. 24, W. E. Tharp, D. R. Kunkel, A. T. Wiancko, and S. D. Conner.

"Soil Survey of Doniphan County, Kansas." U. S. D. A., Washington, D. C., Series 1927. No. 25, E. W. Knobel, R. H. Davis, and H. W. Higbee.

"Soil Survey of Wilson County, Kansas," U. S. D. A., Washington, D. C., Series 1927, No. 22, J. A. Kerr, J. T. Whetzel, and H. W. Higbee.

"Soil Survey of Cecil County, Maryland," U. S. D. A., Washington, D. C., Series 1927, No. 23, S. O. Perkins and W. H. Moore.

"Soil Survey of Harford County, Maryland," U. S. D. A., Washington, D. C., Series 1927,

No. 26, S. O. Perkins and H. B. Winant.

"Soil Survey of Crawford County, Michigan," U. S. D. A., Washington, D. C., Series 1927, No. 29, J. O. Veatch, L. R. Schoenmann, Z. C. Foster, and F. R. Lesh.

"Soil Survey of Kalkaska County, Michigan," U. S. D. A., Washington, D. C., Series 1927, No. 28, J. O. Veatch, L. R. Schoenmann, Z. C. Foster, and F. R. Lesh.

"Soil Survey of Saline County, Nebraska," U. S. D. A., Washington, D. C., Series 1928, No. 12, F. A. Hayes, R. C. Roberts, and E. A. Nieschmidt.

"Soil Survey of The Socorro and Rio Puerco Areas of New Mexico," U S. D. A., Washington, D. C., Series 1929, No. 2, E. N. Poulson and E. G. Fitzpatrick.

"Soil Survey of Gates County, North Carolina," U. S. D. A., Washington, D. C., Series 1929, No. 1, W. A. Davis and R. E. Devereux.

"Soil Survey of Martin County, North Carolina," U. S. D. A., Washington, D. C., Series 1928, No. 8, S. O. Perkins and S. R. Bacon.

"Soil Survey of Victoria County, Texas," U. S. D. A., Washington, D. C., Series 1927, No. 21, William T. Carter, C. S. Simmons, H. W. Hawker, and T. C. Reitch.

Crops

Georgia peaches are famous. A new circular, No. 95 of the Georgia Experiment Station by Horticulturists, G. A. Woodroof and J. E. Bailey, describes "Peach Varieties and Culture."

In their introductory paragraph the authors state "No serious natural handicap to growing peaches exists in Georgia. A complete peach crop failure has not been experienced in several decades. With increasing knowledge concerning pest control and protection from winter injury together with a constant improvement of varieties planted, the future of the industry is promising."

Among the cultural practices discussed in the circular, the authors say of fertilizing: "Fertilizer should be applied the second year, using two pounds per tree of a mixture containing eight per cent phosphoric acid, five per cent nitrogen, and seven per cent potash. The amount applied should be increased one pound each year per tree for six years. . . . The Station has found that fertilizers high in potash produce peaches with better shipping quality, while more than five per cent nitrogen produces excessively dense foliage and causes a heavier set of fruit buds necessitating additional thinning."

Peach growers will find many interesting and helpful suggestions in this circular.

Other important and interesting publications received this month include:

"The Head-Lettuce Industry of California," Col. of Agr., Berkeley, Calif., Cir. 60, Mar., 1932, H. A. Jones and A. A. Tavernetti.

"General Properties of Some Tropical and Sub-Tropical Fruits of Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 237, June, 1931, Onida D. Abbott.

"Forty-Fourth Annual Report," Ga. Exp. Sta., Experiment, Ga., 1931, H. P. Stuckey.

"Eleventh Annual Report, 1930," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 16, June, 1931, S. H. Starr.

"Muscadine Grape Varieties and Culture," Ga. Exp. Sta., Experiment, Ga., Cir. 94, Dec., 1931, J. G. Woodroof and J. E. Bailey.

"Growing Pears in Georgia," Ga. Exp. Sta., Experiment, Ga., Cir. 96, Dec., 1931, J. G. Woodroof and J. E. Bailey.

"Fig Varieties and Culture," Ga. Exp. Sta., Experiment, Ga., Cir. 97, Dec., 1931, J. G. Woodroof and J. E. Bailey.

"Pecan Varieties and Culture," Ga. Exp. Sta., Experiment, Ga., Cir. 98, Dec., 1931, J. G. Woodroof and J. E. Bailey.

"Cauliflower for Corn-Belt Gardens," Agr. Exp. Sta., Urbana, Ill., Cir. 385, Jan., 1932. J. W. Lloyd.

"Carrot Culture," Agr. Exp. Sta., Urbana, Ill., Cir. 386, Feb., 1932, J. W. Lloyd.

"Growing an Orchard in Kansas," Agr. Exp. Sta., Manhattan, Kan., Bul. 254, Feb., 1931, R. J. Barnett.

"Strawberry Growing in Kansas," Agr. Exp. Sta., Manhattan, Kan., Cir. 162, July, 1931, R. J. Barnett.

"Vegetative Propagation of the Black Walnut," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 119, Sept. 1931, B. G. Sitton.

"Results of Seed and Legume Inoculant Inspection for 1931," Agr. Exp. Sta., New Brunswick, N. J., Bul. 535, Jan., 1932, Jessie G. Fiske.

"Forty-Second Annual Report, 1930-1931." Agr. Exp. Sta., State College, New Mex., Fabian Garcia.

"Forty-Fourth Annual Report, 1931, Part I, The College of Agricultures Resident and Extension Instruction," Agr. Exp. Sta., Ithaca, N. Y., A. R. Mann.

"Forty-Fourth Annual Report, 1931, Part II, The Cornell University Experiment Station," Agr. Exp. Sta., Ithaca, N. Y., A. R. Mann.

"The Propagation of Multiflora Rootstocks for Roses by Soft Wood Cuttings," Agr. Exp. Sta., Geneva, N. Y., Bul. 598, Oct., 1931,

H. B. Tukey and Karl D. Brase.

"Legume Inoculant Tests in 1931," Agr. Exp. Sta., Geneva, N. Y., Bul. 602, Dec., 1931, A. W. Hofer and H. J. Conn.

"The Effect of Pruning Apple Trees at Planting Time," Agr. Exp. Sta., Ithaca, N. Y., Mem. 138, Dec., 1931, Joseph Oskamp.

"A Garden Calendar," State Col. of Agr., Raleigh, N. C., Ext. Folder 31, Feb., 1932.

"Fiftieth Annual Report, 1930-1931," Agr. Exp. Sta., Wooster, Ohio, Bul. 497, Jan., 1932, C. G. Williams.

"Grape Culture in Rhode Island," R. I. State Col., Kingston, R. I., Ext. Bul. 57, June, 1931, E. P. Christopher.

"Vegetable Gardening," Clemson Agr. Col., Clemson College, S. C., Bul. 72, Rev., Feb. 1931, C. C. Newman.

"Spring Seeding of Alfalfa," Agr. Exp. Sta., Knoxville, Tenn., Cir. 40, Jan., 1932, L. R. Neel.

"Hop Clover," Agr. Exp. Sta., Knoxville, Tenn., Cir. 41, Jan., 1932, L. R. Neel.

"Lespedeza Sericea," Agr. Exp. Sta., Knoxville, Tenn., Cir. 42, Feb., 1932, C. A. Mooers.

"Forty-Fourth Annual Report, 1930-1931," Agr. Exp. Sta., Burlington, Vt., Bul. 332, Aug., 1931, J. L. Hills.

"Agricultural Seed," Agr. Exp. Sta., Burlington, Vt., Bul. 336, Oct., 1931, Anna S. Lutman.

"Truck Crop Investigations—Onion Culture," Truck Exp. Sta., Norfolk, Va., Bul. 72, July 1, 1930, W. O. Strong, H. H. Zimmerley, and H. T. Cook.

"Forty-First Annual Report for the Fiscal Year Ended June 30, 1931," Agr. Exp. Sta., Pullman, Wash., Bul. 260, Dec., 1931, Edw. C. Johnson.

"Raspberry Culture," U. S. D. A., Washington, D. C., Farmers' Bul. 887, Rev. Dec., 1931, George M. Darrow and George F. Waldo.

"Strawberry Culture—South Atlantic and Gulf Coast Regions," U. S. D. A., Washington, D. C., Farmers' Bul. 1026, Rev. Nov., 1931, George M. Darrow.

"Sudan Grass," U. S. D. A., Washington, D. C. Farmers' Bul. 1126, Rev. Nov., 1931, H. N. Vinall.

"How to Grow an Acre of Potatoes," U. S. D. A., Washington, D. C., Farmers' Bul. 1190, Rev. Nov., 1931, William Stuart.

"Potato Production in the South," U. S. D. A., Washington, D. C., Farmers' Bul. 1205, Rev. Nov., 1931, William Stuart.

"Christmas Trees as a Cash Crop for the Farm," U. S. D. A., Washington, D. C., Farmers' Bul. 1664, May, 1931, F. H. Eyre.

"Farmers in Northern States Grow Timber as Money Crop," U. S. D. A., Washington, D. C., Farmers' Bul. 1680, Dec., 1931, W. K. Williams.

"Experiments on Hybrid Vigor and Convergent Improvement in Corn," U. S. D. A., Washington, D. C., Tech. Bul. 267, Oct., 1931, Frederick D. Richey and George F. Sprague.

"The Shedding of 4-Lock and 5-Lock Bolls in Upland Cotton," U. S. D. A., Washington, D. C., Tech. Bul. 277, Jan., 1932, R. E. Beckett and J. W. Hubbard.

"Proximate Composition of Fresh Fruits," U. S. D. A., Washington, D. C., Cir. 50, Rev. Oct., 1931, Charlotte Chatfield and Laura I. McLaughlin.

"The Bellmar, Southland, and Redheart Strawberries," U. S. D. A., Washington, D. C., Cir. 171, July, 1931, George M. Darrow and George F. Waldo.

"Variety Tests of Sugarcane in Louisiana During the Crop Year 1929-30," U. S. D. A., Washington, D. C., Cir. 187, Nov., 1931, George Arceneaux, I. E. Stokes, and R. B. Bisland.

"Crop Rotation and Tillage Experiments at the San Antonio (Texas) Field Station," U. S. D. A., Washington, D. C., Cir. 193, Dec., 1931, George T. Ratliffe and I. M. Atkins.

"Let's Know Some Trees," U. S. D. A., Washington, D. C., Misc. Cir. 31, Rev. Dec., 1931, Charles H. Shinn.

"The Influence of Weather on Crops: 1900-1930," U. S. D. A., Washington, D. C., Misc. Pub. 118, Oct., 1931, A. M. Hannay and Mary G. Lacy.

"List of Bulletins of the Agricultural Experiment Stations for the Calendar Years, 1929 and 1930," U. S. D. A., Washington, D. C., Misc. Pub. 128, Jan., 1932, Catherine E. Pennington.

"The Relations Between Crop Yields and Precipitation in the Great Plains Area," U. S. D. A., Washington, D. C., Misc. Cir. 81, Oct., 1931, E. C. Chilcott.

Economics

In addition to U. S. D. A. Miscellaneous Publication No. 144, "The Agricultural Outlook for 1932," prepared by the staff of the U. S. Bureau of Agricultural Economics, which was reviewed editorially in our last issue, several State outlook reports have been received and are listed below. With their timely distribution, these important publications have undoubtedly proved of great value to agriculturists in their respective regions.

Other publications dealing with the economics of agriculture include:

"The 1932 Agricultural Outlook for California," Col. of Agr., Berkeley, Calif., Cir. 59, Feb., 1932, H. R. Wellman, S. W. Shear, E. C. Voorhies, and C. J. Poole.

"Florida Truck Crop Competition," Agr. Exp. Sta., Gainesville, Fla., Bul. 238, Aug., 1931, John L. Wann.

"Extension Program in Agriculture and Home Economics, 1932," Agr. Exp. Sta., Urbana, Ill., Cir. 383, Jan., 1932.

*"Agricultural Outlook for Illinois, 1932,"

Agr. Exp. Sta., Urbana, Ill., Cir. 387, Feb. 6, 1932.

"Some Factors Influencing the Mid-Season Potato Market," Agr. Exp. Sta., Manhattan, Kansas, Tech. Bul. 28, Aug., 1931, E. A. Stokdyk.

"Some Factors Affecting the Price of White Burley Tobocco." Agr. Exp. Sta., Lexington, Ky., Bul. 323, Oct., 1931, Dana G. Card.

"An Economic Study of Dairy Farming in Grafton County, New Hampshire, 1930," Agr. Exp. Sta., Durham, N. H., Bul. 260, Dec., 1931, M. Gale Eastman.

"Successful Farm Practices in the Upper Peninsula," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 215, Oct., 1931, G. W. Putnam.

"Systems of Farming in Eastern and Southern Minnesota," Agr. Exp. Sta., Univ. Farm, St. Paul, Minn., Bul. 276, Jan., 1931, L. F. Garey and F. F. Elliot.

"Timely Economic Information for Washington Farmers, Washington Farm Outlook for 1932," State Col. of Wash., Spokane, Wash., No. 5, Feb., 1932.

"The Farm Real Estate Situation, 1930-31," U. S. D. A., Washington, D. C., Cir. 209, Dec., 1931, B. R. Stauber.

Making the Club

(*From page* 24)

grown in 1930, 16 used old sod land or pasture, while the remainder utilized land that had been in cultivated crops the year before, 9 of them following potatoes with potatoes.

The lack of a definite rotation utilizing legume sod for the potato crop is probably the weakest point in the methods of these men who appreciate the value of good seed, large quantities of plant food, and thorough spraying for disease and insect control.

The records give us a cross section of the methods of our better potato growers, and point out the trends which these men are using to obtain more and cheaper potatoes per acre.

Fertilizers Pay in West Tennessee

(*From page* 26)

way, for the part which had received the potash yielded at the rate of 1,512 pounds per acre while the part that had received none made only 608 pounds per acre, a difference of 904 pounds as a result of the use of this potash. The cotton on the unfertilized half grew to be only 2 to 2.5 feet high and shed all leaves, while that which received the potash grew to be 4 to 5 feet high and retained most of the leaves until killed by frost.

The outstanding facts are that potash was the limiting factor and that there was sufficient nitrogen and phosphorus available to produce a good crop of cotton, the yield being limited by potash, which when supplied, corrected the potash hunger which caused the rust, its outward indication.

Another demonstration placed in West Tennessee on a farm owned by J. R. Hall and worked by E. M. Bryant, both of Covington, Tipton county, tells almost the same story. This was placed on valley land, a light-colored silt loam, treated in three ways: No. 1 received 200 pounds per acre of calcium cyanamid and yielded 1,101 pounds of seed cotton per acre; No. 2 received no fertilizer and yielded 1,004 pounds of seed cotton per acre; while No. 3 received 200 pounds of cyanamid and 100 pounds of muriate of potash and made 1,693 pounds of seed cotton per acre, a difference of 592

pounds as a result of the use of potash.

Still another demonstration in Dyer county, west of Dyersburg, located on typical delta soil was placed on the farm of John Tarrant near Finley, Tennessee. Here the cyanamid alone gave the very high yield of 2,568 pounds of seed cotton per acre; the unfertilized portion made 1,875 pounds; yet 200 pounds of cyanamid and 100 pounds of muriate of potash pushed up this yield to 3,183 pounds of seed cotton per acre, an increase of 615 pounds as a result of the potash.

Taking the above and a number of other demonstrations conducted in the same territory into consideration, I believe 4-8-8, that is, 4 per cent nitrogen, 8 per cent phosphoric acid, and 8 per cent potash, will come very close to the requirements of the upland soils of this section. For the white lands I believe a 4-8-12, used at the rate of 400 to 600 pounds per acre, will be required. These two analyses will meet the requirements for tomatoes, sweet potatoes, strawberries, and cotton. For the delta soils, it seems that nitrogen and potash combined are necessary, the two to come from sources that are cheapest, availability considered.

DeLongchamp—Potato Champion

(*From page 9*)

blight. He had a sorry mess that year and learned an expensive lesson.

Mr. DeLongchamp grows five or six acres of potatoes each year. He hill-selects his seed for a seed plot. He always treats his seed with corrosive sublimate, plants on a last year's sod, and practices a four-year rotation.

Reasons for Success

There are several reasons why he hasn't had less than 300 bushels per acre in 10 years. I already have mentioned his method of seed treatment. He has always spread about 15 loads of manure on his sod ground in the early spring, disced it in thoroughly, and then added about 500 pounds of 16 per cent superphosphate per acre after plowing. Sometimes, if he is short on manure, he adds a complete fertilizer. He rows his field three feet apart and usually plants 14 inches apart in the rows. He always cultivates by using a harrow before the potatoes are up, thus killing the bulk of the weeds. He practices level cultivation. When the vines are six inches high, he starts to spray with Bordeaux mixture and repeats the operation every few weeks, even spraying after the vines completely cover the ground. He takes no chance with leaf hoppers, aphis, or blight. He uses bug poison, if necessary, in with the Bordeaux mixture.

The results of this procedure have been excellent. Highest yield up to 1931 was 420 bushels per acre in 1924, and that year he had the honor of being State champion.

This past spring and summer, Mr. DeLongchamp used all the methods he had been using for the last 10 years except that he used more fertilizer and a different analysis. He increased the potash content, with the result that he increased his yield. He covered his field with 15 loads of manure per acre, which he reinforced with 300 pounds of 20 per cent superphosphate. The manure and superphosphate were disced into the soil, after which it was plowed to a depth of eight inches. At planting time, 450 pounds of 2-8-10 fertilizer analysis were applied with the potatoes, which were planted 13 inches apart.

Mr. DeLongchamp says he never used so much fertilizer before and his

increased yield over previous years is due, he believes, very largely to having plant food available when the plants needed it. He also says that if there is any plant food left over which the potatoes do not use, the next year's crop of barley or oats will use it. His past yields of barley and oats are proof of his believing that surplus of fertilizer, if such exists, is not wasted.

There are advantages other than large yields obtained by the use of hill-selected seed treatment, spraying, level cultivation, and use of plenty of fertilizer. Out of his yield of 538 bushels per acre, only 7¾ per cent of the crop went into No. 2 and No. 3 classes. His No. 2's will make excellent seed as they are smooth, clean, true to type, free from disease, and come from excellent ancestry. Then, too, 80 per cent of the crop was good enough to be used as certified seed. The field was inspected by representatives of the Michigan Crop Improvement Association. The tubers were inspected in the bin and met all the requirements as set down by the Crop Improvement Association.

Mr. DeLongchamp's certified seed has been shipped in carload lots into New Jersey, Long Island, New York, Pennsylvania, and lower Michigan. He always receives a premium for his certified seed and never has enough to take care of the demand. He also has a special trade for his eating stock.

Why does he make himself all this extra work for treating seed, spraying, selecting seed, and rogueing out diseased hills? Ask him. He will tell you that he gets yields far in excess of the average grower, that he has a smaller percentage of culls, and that he gets a premium price for what he sells. Consequently, he is perfectly willing to do all the extra work and lay out money for additional fertilizer.

Dairy Feed at 2c per lb. of Protein

(*From page 27*)

variously treated areas of the demonstrations between June 1 and June 15. The effect of the treatments continued through the entire season and were in most cases still very evident a year later when the second fertilizer applications were made. Consequently these June harvest data do not give full credit to the efficiency of the fertilizer. This was particularly evident in the case of the phosphorus and the phosphorus and potassium plots, since a very heavy growth of white Dutch clover showed up in these plots later in the season. However, what these data do do is to show what return was obtained in 75 days or less. The data are presented in the following table.

Pasture improvement demonstration on the William Murdock farm in Lawrence county, Ohio—Mr. Murdock on the right. In the rear is the Ohio State University truck used to assemble harvest samples for final yield and protein determinations.

1931 DATA ON 26 PERMANENT PASTURE DEMONSTRATIONS IN SOUTHEASTERN OHIO

Plots harvested once between June 1 and 15

Plot numbers	Check	1	2	3	4	5	6	7
*Treatments	None	N-P	P-K	P	N-P-K	½N-P-K	N-¼P-¼K	N
Pounds of oven dry grass per A., spring to June harvest	1,105	2,940	1,687	1,429	3,087	2,431	2,718	2,255
Gain for treatment, spring to June harvest	0	1,835	582	324	1,982	1,326	1,613	1,150
Per cent protein in dry matter	10.44	10.60	10.03	10.55	11.55	11.25	11.08	11.55
Pounds protein per acre spring to June harvest	115.36	291.64	169.21	150.76	356.55	273.49	301.15	260.45
Return per acre based on protein at 7c per lb.	$8.07	$20.41	$11.84	$10.55	$24.96	$19.14	$21.08	$18.23
Cost of treatment	$1.50	$6.75	$4.00	$3.00	$7.75	$5.83	$7.75	$5.25
Returns per acre above cost of treatment	$6.57	$13.66	$7.84	$7.55	$17.21	$13.21	$13.33	$12.98

* Lime was applied where required. When applied it was used alike on all plots including check at an average annual cost of approximately $1.50 per acre

N = 50 pounds nitrogen per acre per year at a cost of $3.75 annually
P = 120 " phosphoric acid per acre 1 year in 4 at a cost of $1.50 annually
K = 80 " potash per acre 1 year in 4 at a cost of $1.00 annually
½N = 25 " nitrogen per acre per year at a cost of $1.88 annually
¼P = 30 " phosphoric acid per acre per year at a cost of $1.50 annually
½K = 20 " potash per acre per year at a cost of $1.00 annually

The cost of the fertilizing elements is based upon 7½c for nitrogen, 5c for phosphoric acid, and 5c for potash. Recent quotations in American Fertilizer justify these prices.

It may be observed from this table that all treatments used gave gains in excess of the cost of treatment, but particularly noteworthy is the fact that the most expensive treatment gave the greatest balance and that the second increment of nitrogen was almost as effective in producing pasturage as was the first. The first produced 744 pounds grass while the second produced 658. The nitrogen recovered in the first case was 66.8 per cent while in the second it was 60 per cent, thus indicating that heavier applications might yet be used with profit.

The protein produced by these treatments represented a cost for fertilizer of 2c per pound in the case of second increment and less than 2c in the case of the first. Since the dairyman commonly pays around 10c per pound for his protein and since in southeastern Ohio in particular he pays out between a fourth and a fifth of his gross receipts for feed, largely protein feed, these data are of very particular significance. This project has demonstrated that if the dairyman will keep his pasture sod in good condition by the use of phosphoric acid and potash, he can encourage its growth, two, three, or more times by varying his nitrogen applications to meet his annual needs.

In these demonstrations thus far, potassium has also made a good showing. By reference to the last line of the table it may be noted by comparing plots 2 and 3 that the potassium paid for itself and left a balance of 29c in this brief period of 75 days. A comparison of plots 1 and 4 shows up still better for potassium for here it has paid for itself and left a balance of $3.55.

These results, however, must not be taken too seriously for they represent the results of a single year only. They do justify the conclusion that where the pasture can be properly utilized, liberal fertilization is a very profitable investment and under many conditions the use of a complete fertilizer should take preference over our old standard treatment of lime and phosphorus. These are the conclusions reached by Ohio farmers who watched the progress of these demonstrations. As a result hundreds of acres of Ohio pasture are receiving fertilizer applications at this time.

Testing Fertilizers on Oregon Berries

(*From page 22*)

FRANK CARLISLE, SPRINGBROOK, OREGON

Soil Type—Melbourne Silty Clay Loam

LOGANBERRIES

Plot	Fertilizer Used	Yield Per Acre	Increase Over Check
1	150 lbs. Ammonium Phosphate per acre 100 lbs. Sulphate of Potash per acre	8,200 lbs.	1,040 lbs.
2	Check (No Fertilizer)	.....	.....
3	Complete 3-10-7 (1,000 lbs. per acre)	8,910 lbs.	1,750 lbs.
4	Check (No Fertilizer)	.....	.....
5	Complete 3-7-10 (1,000 lbs. per acre)	10,050 lbs.	2,890 lbs.
6	Check (No Fertilizer)	.....	.....
7	Complete 3-5-5 (1,000 lbs. per acre)	8,930 lbs.	1,770 lbs.
	Average of the 3 check plots	7,160 lbs.	.....

INDIVIDUAL PICKING RECORDS—1/10 ACRE PLOTS

Picking	Plot 1 Lbs.	Plot 2 Lbs.	Plot 3 Lbs.	Plot 4 Lbs.	Plot 5 Lbs.	Plot 6 Lbs.	Plot 7 Lbs.
1	82	81	94	78	101	80	86
2	84	79	89	77	112	75	92
3	112	126	152	134	131	119	142
4	144	118	143	107	159	116	131
5	129	110	139	112	158	109	144
6	109	86	112	99	122	100	128
7	91	70	88	81	118	92	108
8	79	29	74	19	101	52	62
Totals	820	699	891	706	1,005	743	893

The above records clearly indicate that the fertilizer with the highest percentage of potash gave outstanding results.

In the case of the blackcaps, the 3-5-10 fertilizer resulted in an increase of 1,432 pounds per acre which at 5c per pound meant $71.60 per acre. The net gain for fertilizer after deducting cost of picking and cost of applying the fertilizer was $41.46 per acre.

In the case of the loganberries the 3-7-10 complete fertilizer resulted in an increase of 2,890 pounds of berries per acre which at 5c per pound meant $144.50 per acre. The net gain after deducting picking costs and cost of application of the fertilizer was $100 per acre.

County Agent White is obtaining complete records of each picking on each plot throughout the season. The 1931 record of these pickings, appearing above, reveal another interesting indication, that on plots receiving the largest amount of potash, the season of heavy fruiting was lengthened.

Canning tests on berries from each fertilizer treatment is another feature of the careful work being undertaken in Yamhill county. These tests will add completeness to the work and are convincing proof of the effectiveness to be gained when all concerned give their thought and support in seeking out fertilizer knowledge.

Alfalfa Longevity

(*From page 29*)

The results show that the use of phosphorus alone is not maintaining the yield. Potash alone has maintained and even increased the yield over that secured the first year. The plot that received the combination of phosphorus and potash, while giving the lowest yield the first year, is now the highest yielding plot of the three. In fact, the yields on this plot have increased steadily each year and the stand on this plot looks as good as it did the first year.

Pictures taken of the yield on equal areas typical of each plot in June, 1931, show that a rather large percentage of the hay on the phosphorus-alone plot was timothy instead of alfalfa. There was very little timothy on the two plots that received potash. On these plots, the alfalfa made a rank, vigorous growth and had practically a full stand of alfalfa at the end of three years. On the phosphorus-alone plot, the stand of alfalfa was uneven, and many of the surviving plants had yellow, unthrifty leaves which showed the regularly spaced white spots around their margins which are sure signs of potash starvation.

Fertilizers Make Pasture Profits

(*From page 8*)

phorus in the hay from the complete fertilizer (NPKL) plots was 0.04 per cent greater than in the hay from check (no treatment) plots.

In the case of calcium content of the pasture cuttings there appeared to be no consistent increase in this element due to fertilizer treatment. However, in the hay cuts there was a rather consistent increase due to fertilizer treatment. The average percentage of calcium in the hay from the check (no treatment) plots was 0.53 per cent, while in the hay from the complete fertilizer (NPKL) plots it was 0.60 per cent. On soils deficient in lime, it might be expected that the calcium content of pasturage could be increased by applications of lime.

Protein content of the pasture cuttings was increased by fertilizer treatment. An average of 14.68 per cent protein was obtained for the check (no treatment) plots, while the average for all fertilizer plots was 15.68 per cent protein. Highest averages for protein were obtained on the phosphorus (P) and the phosphorus-potassium (PK) plots. The complete fertilizer (NPKL) plots showed the lowest average percentage of protein. This was probably due to the fact that only a small amount of nitrogen was applied in one application early in the spring. In considering these results, one must also have in mind total yield of protein per acre, as well as percentage of protein. The complete fertilizer plots showed up to good advantage in total yield of protein per acre.

The percentage of protein in the hay cuts was not increased by fertilizer applications.

By no means the least important influence of the fertilizer treatments in these tests was their effect on the character of the pasture sod. After two years' treatment it was observed that the fertilized plots had a more densely matted sod, able to better withstand grazing and recover faster.

Clovers were encouraged on all fertilized plots, but especially on the phos-

phorus (P), phosphorus-potassium (PK), and phosphorus-potassium-lime (PKL) plots.

Worthless species of grasses were discouraged, and some of the better tame and native species became more prominent.

Very definite weed control was beginning to be apparent on some of the fertilized plots. Even Canada thistles were noticeably controlled on one series of plots.

In comparing the yields and the composition of the pasture cuttings with those of the hay, it is interesting to note that although the greatest amount of dry matter was obtained from the hay crop in most cases, the amount of plant food removed from the soil by the pasture cuttings was in practically all cases far in excess of that removed by the hay crop. The reason for this is the fact that the pasture grass contains a much higher percentage of the mineral matter. Although the total yield of dry matter obtained from the pasture cuts is less than that obtained from the hay cuts, the higher percentages of mineral content show that using land for pasture takes more fertility out of the soil than would be taken out if the field was left to be cut for hay.

Higher-yielding pastures from which the animals can harvest a better quality of feed are rapidly becoming a pressing need. The results of this work, showing that these improved conditions can be expected from application of fertilizers to the pasture land, offer much encouragement to the dairymen of Western Washington.

Delaware "Sweets" Respond to Potash

(*From page* 18)

in storage. However, the rots seem to develop in storage more readily from some fertilizer treatment than others. The percentages of rots appearing on the potatoes fertilized with kainit and manure salts were about twice the percentages appearing on those fertilized with muriate or sulphate of potash. The shrinkage was about the same in all plots.

From a careful study of the results of these experiments, Delaware farmers may well ask themselves whether or not they are applying to their sweet potato crop enough potash to grow maximum yields. Statistics reveal that the average yield of sweets in 1929 was 145 bushels per acre. The average fertilizer application on the crop for the same year was approximately 800 pounds per acre of a 3-8-8 mixture. This application supplied 64 pounds of actual potash.

However, Shiver of South Carolina has pointed out that for every bushel of sweet potatoes removed from the soil 5.2 ounces of actual potash was removed. A 400-bushel crop would therefore remove 130 pounds of actual potash per acre.

On this basis 800 pounds of the 3-8-8 mixture does not supply enough potash to grow a 400-bushel crop. According to the figures given above, a 400-bushel crop will remove 130 pounds of actual potash. A 1,500-pound application of a 3-8-10 will supply 150 pounds of actual potash. This is in excess of what a 400-bushel crop needs. We are told by German investigators that some potash may be lost by leaching and chemical change and that potash in excess of the actual crop needs is desirable.

Turning to the Delaware results, it will be noted that the highest yield of 351 bushels was obtained with 1,500 pounds of a 3-8-10. Certainly high yields are obtainable, and the evidence is strongly in favor of the adoption of fertilization practices that will accord with the results herein reported.

On Heavy Soils Alfalfa Needs Phosphoric Acid and Potash

(*From page* 30)

The data presented in Table I were obtained in the summer of 1929. The fertilizer was broadcast before the seeding of wheat in the fall of 1927. The fertilizer caused considerable increase in the yield of wheat in 1928, but the principal profit came from the alfalfa crop the following year. After deducting the entire cost of the fertilizer from the value of the hay, it is apparent from the data that a very good profit was made from the investment in fertilizer. Sixteen per cent superphosphate at the rate of 250 pounds per acre returned profits of $7.75 and $10.11 per acre, while 500 pounds of the same material netted $13.95. The greatest profit of all, however, came from the plat treated with superphosphate and potash in the proportion of 0-16-10. This plat, after fertilizer costs had been deducted, showed a profit of $15.27 per acre. A larger proportion of potash produced a still larger yield of hay, but the higher cost of the fertilizer caused a decrease in net profit.

On another farm of the same soil type, liberal applications of barnyard manure seemed to take the place of commercial potash. The field had received a uniform application of manure previous to the sowing of the fertilizer and as a result the 0-16-0 seemed to be all that was needed in the way of fertilizer. It would have been more economical, however, to have used the manure on other crops and to have depended on commercial potash for the alfalfa crop.

A Similar Experiment

A similar experiment was conducted on Wisner silt loam on the farm of Iven Heckroth near Unionville, Michigan. This soil is much like the Brookston, although it usually contains more organic matter and is always strongly alkaline. The results presented in Table II show that a combination of phosphoric acid and potash had a strong tendency to increase the yield of alfalfa.

The fertilizer on this field was broadcast just before the wheat was

Table 1. The Effect of Fertilizers on the Yield of Alfalfa on Brookston Loam.

Treatment*	Dry Hay per Acre 2 Cuttings, 1929	Increase Due to Fertilizer	Value of Increase	Cost of Fertilizer	Profit
0-16-0 250 lbs.	4,380 lbs.	1,320 lbs.	$10.05	$3.30	$7.75
0-16-10 "	5,040 "	1,980 "	14.85	4.74	10.11
Check	3,360 "				
0-16-0 500 lbs.	5,800 "	2,740 "	20.55	6.60	13.95
0-16-10 "	6,360 "	3,300 "	24.75	9.48	15.27
Check	2,760 "				
0-16-20 "	6,560 "	3,500 "	26.25	12.35	13.90

*The fertilizer was applied broadcast before the seeding of wheat in the fall of 1927. Increase due to fertilizer is the plat yield minus the average yield of the two checks.

In all the calculations alfalfa hay is considered to be worth $15 per ton. The cost of the fertilizers is calculated on the basis of $3.75 per unit for nitrogen, $.90 per unit for phosphoric acid, $1.15 per unit for potash, and $12 per ton overhead cost. Profit is taken as being the value of the increase in yield minus the cost of the fertilizer. Loss is the cost of the fertilizer minus the value of the increase in yield.

Table 2. The Effect of Fertilizers on the Yield of Alfalfa on Wisner Silt Loam.

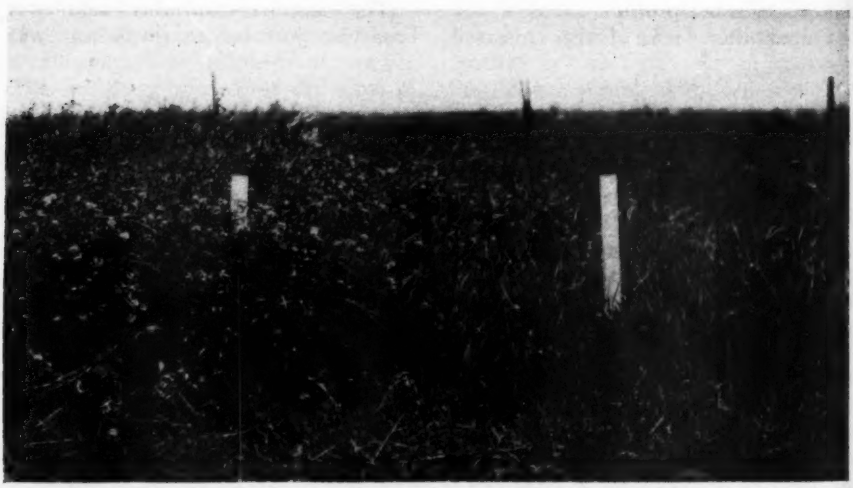
Plot	Treatment*	Yield Dry Hay per Acre 1930 lbs.	Increase Due to Fertilizer lbs.	Value of Increase		Cost of Fertilizer	Profit	Loss
				Wheat 1929	Alfalfa 1930			
103	4-0-8 250 lbs.	762	120	$ .19	$ .90	$4.52		$3.62
104	4-8-8 250 "	1,212	568	21.01	4.26	5.42		1.16
106	4-16-8 250 "	2,391	1,744	18.26	13.08	6.32	$6.76	
201	0-16-0 250 "	2,989	1,949	18.34	14.62	3.30	11.32	
203	0-16-8 250 "	3,734	2,708	16.14	20.31	4.45	15.86	
204	2-16-8 250 "	3,366	2,353	23.30	17.65	5.39	12.26	
206	4-16-8 250 "	3,398	2,306	17.03	17.30	6.32	10.98	
207	8-16-8 250 "	2,776	1,591	26.28	11.93	8.20	3.73	
209	4-16-8 500 "	4,668	3,390	19.10	25.43	12.64	12.79	

*The fertilizer was applied broadcast before the seeding of wheat in the fall of 1928.

drilled almost two years before harvesting the alfalfa. As a result of this, one would not expect the nitrogen to have much effect on the alfalfa yields. Nitrogen and potash together, applied at the rate of 250 pounds of 4-0-8, produced an increase of only 120 pounds of hay and, considering fertilizer costs, caused a loss of $3.62 per acre. An addition of 8 per cent of phosphoric acid cut the loss to $1.16 per acre and a further addition of phosphoric acid, making a 4-16-8, resulted in net gains of $6.75 and $10.98 respectively, per acre.

The plats receiving this same quantity of phosphoric acid and potash without nitrogen gave yields of hay equal to those plats receiving nitrogen and as a result the lower fertilizer costs, greatly increased the profit obtained. Plat 209 receiving 500 pounds of 4-16-8 produced the highest yield of any of the plats, but the high cost of the fertilizer cut down the profit until it was only $12.79 compared with a profit of $15.86 resulting from the use of 250 pounds of 0-16-8.

The results from this field show that on every plat treated with phosphoric acid and potash the increase in the wheat crop alone more than paid for



A complete fertilizer on Wisner soil will not only increase the yields of grain, but will benefit the following alfalfa crop. Left, 500 lbs. of 4-16-8 applied with wheat in the fall; right, no treatment.

the cost of the fertilizer. This being the case, the increase in the alfalfa crop was all clear profit. There should be no hesitation then in using at least 250 pounds of 0-16-8 for best results with the alfalfa crop on this type of soil.

Inasmuch as wheat requires considerable available nitrogen, it is advisable to use a complete fertilizer on both of these soil types. If considerable barnyard manure or green manure is used in the rotation, a 2-16-8 or 2-12-6 may suffice, otherwise a 4-16-8 is to be recommended.

Experiments on other types of heavy soils, such as Miami loam and Miami silt loam, have produced results similar to those obtained on Brookston and Wisner soils. As these soils make up the bulk of the heavy soils in eastern Michigan, a rather general statement can be made to the effect that if grain is to be used as a nurse crop for alfalfa on these soils, it should be treated with not less than 250 pounds of a complete fertilizer high in phosphoric acid and comparatively high in potash. On some of these fields, it may be necessary to use 500 pounds of this fertilizer mixture if maximum profit is to be obtained. Experimentation is the only way of determining the most economical amount for any certain field.

The Inquiring Mind

(*From page* 16)

ing, right thinking, and right farming. For twenty-one years in the newspaper that bore his name, he brought his message to a wider and wider circle. The natural infirmities of age forced no limitations upon the printed page. The mind and purpose were clearer, and the philosophy of life was riper, as he neared the end. As a minister, he would have been superannuated. As a lecturer, he would long ago have been retired. As editor, he renewed his youth at the fountain of a genial optimism that kept him young in spirit and fresh in the hearts of his readers.

Greater than editor, greater than preacher, greater than the platform speaker, was Henry Wallace, the man. His writing and preaching and speaking were merely instrumentalities, through which a great personality was projected upon the consciousness of the Midwest. He is remembered not so much for what he did, as for what he was.

Henry Wallace's editorial service began by the writing of two columns of agricultural matter weekly for a local paper. Then he bought *The Winterset Chronicle* to give himself wider scope in farm and public affairs. Soon he became acquainted with many publishers of county papers who were interested in farm matters, and they formed an Agricultural Editors' Association. From it arose the Farmers' Protective Association to break the barbed-wire trust, which was at that time charging exorbitant prices. The campaign waged and the victory won showed Mr. Wallace the power of the press and incited him to new and more extensive efforts in behalf of the farmers of Iowa.

In 1883, he began writing for the *Iowa Homestead*, and later became a partner in its publication. In its columns he fought energetically to clean up Iowa politics, especially as they related to railroad rates and service. In the early nineties, when almost sixty years old, he left the *Homestead* and faced the necessity of making practically a fresh start in life. This was the most serious business situation he had ever confronted; but he faced it bravely and eventually achieved success.

At that time, says a record of the matter, his oldest son, Henry C. Wallace, who later served as U. S. Secretary of Agriculture, was teaching in Iowa Agricultural College, and his second son, John P. Wallace, was a student in that College. They were interested in a little semi-monthly paper called *The Farm and Dairy*. Henry Wallace joined his sons in its publication; became editor; and in 1895, changed its name to *Wallace's Farmer*. Hard work by all members of the family caused the paper to grow by leaps and bounds until at the time of Mr. Wallace's sudden death February 22, 1916, it had gained a position of commanding influence as one of the leading agricultural papers of the country.

Many Outside Activities

While acting as editor-in-chief of his paper, Mr. Wallace also found time to attend and speak at many agricultural, social, and religious gatherings. He was a forceful, practical, and convincing speaker, a potent preacher of diversified farming, conservation of fertility, rotation of crops, improved livestock, and better farm living. He inspired the sending out of the first special train to further the interests of dairying, better corn growing, and good roads.

Honors came to him in recognition of his work. In 1908, he was appointed a member of President Roosevelt's Country Life Commission, and later served as president of the National Conservation Congress. He made several trips to Europe, and won recognition there as an authority in agricultural practice and science. In the summer of 1913, at the age of seventy-seven, he went with Hon. James Wilson, Secretary of Agriculture, to attend the Pan-Presbyterian Council in Scotland, and to make a study of agricultural conditions in Great Britain. Upon their return, they made an instructive report to the Governor of Iowa on land laws and tenantry in that country.

Secretary Wilson said that there was a great many delightful sides to Henry Wallace. He had a beautiful sense of humor and was an exceedingly broad man. Of the Wallace family, he said: "I have never known a family that has followed the footsteps of their parents more closely than the sons and daughters of Henry Wallace. This is one of the strongest endorsements of the family head, and it is difficult for us to endorse the lives of great men and women, unless their families practice the precepts they taught."

Henry C. Wallace, who did admirable work as Secretary of Agriculture, died October 25, 1924. A younger son, Daniel Alden Wallace, is the able editor of *The Farmer*, St. Paul, Minnesota. Henry A. Wallace is carrying on *Wallace's Farmer* with all the zeal and ability of his father, Henry C. Wallace, and of his noted grandfather.

Ex-Senator Lafayette Young, editor of *The Des Moines Capital*, said in a tribute to Henry Wallace "Cabinet positions and governorships were within his reach; but he did not seek them. He was a patriarch of the church. He was the adviser of presidents and cabinet ministers. In his editorials he blended religion and practical living. He was the friend and supporter of every good cause. His work will endure and will benefit other generations."

Left Sound Advice

Henry Wallace's last will was unique in the sage and sound advice it gave to his family. Among many other wise admonitions, he said to them: "Keep clean in speech, clear in mind, vigorous in body, and God will bless you." Further, he said: "Experience has led me to the conviction that many men live less worthily than they might, because they are uncertain of their relationship to the Divine. If they have become imbued with the materialistic philosophies which pervade the teachings of so many of our higher institutions of learning, they fail to develop in themselves the God-consciousness without which man can-

not live worthily. I solemnly warn you against this materialistic philosophy."

Henry Wallace—the militant champion of "Good Farming, Clear Thinking, and Right Living;" the sponsor and spokesman for what he beautifully called the "Voiceless Soil"—has gone to his reward; but his good deeds and wise counsel live after him. Would that we had more preachers and teachers of this type and character!

Applying the Cure

(*From page* 13)

plied. Only small showers occurred between the application of the potash and the harvesting of the crops.

It was not long before there were signs that the diagnosis as potash starvation was correct. Both the corn and the soybeans where the extra potash was applied turned green and began to grow normally in spite of the very dry weather.

When the crops were harvested, it was found that the top-dressing of 100 pounds of muriate of potash, although applied very late in the season, had increased the yield of corn from 13.65 bushels per acre to 29.96 bushels, a gain of 16 1/3 bushels. The extra potash not only made more corn but it also made better corn. The potash on the soybeans increased the yield of hay from 1,453 pounds per acre to 2,066 pounds, a gain of 613 pounds.

Demonstrations on the Conasauga, Colbert, and Hollywood groups, commonly referred to as Flatwoods soils, show that all crops in this area should receive relatively large amounts of potash. This has also been found true for the Flatwoods soils of Georgia and the Carolinas.

While a late application of potash helped Mr. Hammond's corn and soybeans, observations of the effects of extra potash in many crops on both clay and sandy soils during recent years show that it is not practical for a farmer to wait until his crops reach the starvation stage before he begins to look for results from extra potash. Cotton, which shows absolutely no signs of rust, will give a profitable response to extra potash. The same thing may be said for potatoes, sweet potatoes, fruit, and other crops.

The corn on the left is suffering from root rot. The condition has been corrected in the corn on the right, by the application of 100 pounds of muriate of potash per acre.

Sophistication

(*From page 4*)

look, a constant tension that breeds new cases continually for the neurologist and the psychiatrist.

Gone are the slippery cushioned armchairs under the harness-shop awning, and the universal daily chats in the post-office lobby are mainly between the love-lorn and the unemployed. The chain store brooks no loitering, encourages no forums, and exposes no cracker barrels for philosophers' fingers. The drug store is a refreshment palace rather than a spot for sufferers to console each other and trade satisfying prescriptions. The barber shop is now a quiet spot, free from lurid language and devoted to dames. No longer may I find the bewitching curves of lovely radiance in the pink pages of the Gazette therein reposing, for my favorite haircut waiting period must be whiled away with hints to housewives and kindred blah. The curtained saloon is no longer tolerated as the poor man's club and the refuge of the hen-pecked. The mender of tires has no pausing place for conversation as one found of yore in the smelly smithy.

ABOUT all that remains is the pool hall, with its loud speakers and perhaps its speak-easy. Against its modern attraction as a gathering and a gossiping place the church and the school have no contrary voice. The village church is closed except on Sundays and takes complete vacations in summer while the devil is busiest. The school board is sown up tight in red tape and refuses to let the school house be used as a social center.

Ergo, with so much more news and a swirling confusion of opinions by mouth, microphone, and magazine, our dear old village has less time to ponder and digest it. Actions and motives flash across country and are caught and reflected instantly in hamlets remote from the places of origin. Villagers do not pause to talk over the pros and cons of a subject in the glow of ripe experience, but they stampede as one unit in whatever direction the current flows from the dynamos of duplication.

Do you recall the Cleveland panic? Well, our villagers were not hoarding and skimping so universally on such short notice as in the "Hoover slump." You may answer that they did not have so much to hoard or skimp nor so far to fall from high levels of living. But I beg to infer another reason. It was the difference in communication. The result of standardized thinking habits induced by instant information caused us to be universally depressed as quickly as we became bucket-shop gamblers prior to the crash.

WE have sensitized our cross-country nervous system to such a degree that there are either no more rubes or else we are all yokels of circumstances and no longer captains of our fates and masters of our souls. The Kiwanis lecturer may say that we are in sonorous poetry, but he forgets that the man who lives by the side of the road gets all the dust and hears all the rumors.

If rapid communication and quick transportation have banished the boor and made us all equals in information and tooth-paste habits, they also have removed that fine deliberative independence of thought and action which once characterized inland America as we knew and loved it. I am not upholding ignorance as bliss, but I deride knowledge as a blister.

Whether these concrete-paved and ether-linked villages will breed better Lincolns than the hamlets of early days remains to be seen. If the new

crop of youth reared in such modern scenes does its accustomed stunt, then they will act before they think, bound up on the spur of the moment and rush rashly to make sudden news, just to be there first in a period when this is *so* hard to do. But it is a sad fact that even when you dash pell-mell into an auto crash in zeal for news-making, somebody else may have the straight facts even before you do.

HASTY legislation is bemoaned by many. Popular panaceas are sought and then as quickly severed. Have you ever considered the possible reason for it? Maybe the deserted chairs of the village seers could tell the mute story. They have been replaced by road maps and chain programs, by hectic beckonings to keep on moving, by vehement votaries of unrest. To sit down in a somnolent spot and cogitate, to hold up a question and let the perspective of years and past records sift through it is not for us in these days. The slogan now is the fever-call of youth: "We want a touchdown!"

I am aware that what I say is frightfully old style. It is a confession of maturity and a slowing up of pep. I am also aware that this is no place for me—in the middle of the highway where the cars will crush me with adverse opinion. I should stay on the sidewalk with my crutches and the nurse.

It frequently amuses me to pick up magazines and read some self-appointed old maid, who is supposed to be an authority on child rearing, relate how to break the news of nativity to tender minds. By the time you study it all out and get a fine fairy story handy to drape the facts in, the children know more about the matter than you do. This much, if not more, the movies have done for perplexed parents. And what the movie fails to elucidate the library will. Hence it is a simpler thing nowadays to raise children. You don't have to study biology and psychology to equip yourself for revelations. Seething society does it for you.

Back in the old easy-going days we shared together, it was not hard to believe the yarns we heard from travelers in the southern mountain regions. You recall the tales—about ancient folk who gaped with astonishment when they learned that George Washington was dead. We could well swallow all that because we were often uncertain of election results for a week because of bad roads and fiercely fought contests. Why, we often waited until next day for the score of the football games. And what is worse, we had to read the Congressional Record to get the gist of our representative's appeal for a new post-office. And the fellow who planted potatoes did not know there was a bumper surplus until he tried to sell them the autumn afterward. We were not, you see, so hemmed in with visible misery as we are these days. We took our medicine like men, in large and vigorous doses, not sipping it in slowly in constant daily concoctions. We had our jags of depression and our flights of joy, but they were not injected into our blood stream with our meals.

SOPHISTICATION means to be worldly wise and to be deprived of natural simplicity. It does not by any means signify the possession of any great select store of human or scientific lore; all it means is to be "hep" to all the superficial things.

I can take you to quite a number of scientific friends of mine who rank among the greatest in their respective lines, and you will find them remarkable for their naiveté, their unblinking, baby-like stare at the passing world. To such a degree is this characteristic of the scientist that the "absent-minded" professor has become a trite descriptive expression. Men who know lots of vital things about irradiated ergosterol or Brucella melitensis cannot tell you which cars are

equipped with free wheeling or who the champion heavyweight of the moment may be. Sad to say, they also fail to annex the latest facts about the holder of the non-stop flying record or the recent tree-sitting endurance winner.

There is this saving grace about such indifference to modernity—it keeps your internal mental appetite well whetted for the things that will last. One who is weary and blasé about the wonders of the world seldom contributes anything much to new wonders. It's just like the pioneers who built the nation from the stumps because they admired natural simplicity and took fresh delight in making great things slowly with humble tools. Youngsters born nowadays suffer the handicap of emerging into a world surfeited with cheap, ready-made means and materials. What's the use of spending time making things for yourself when the shelves are full of them?

I AM frank to say that our school system works better on the youngsters than it did when I enrolled with my slate and pencil. That is, they progress faster through the mazes of mathematics and seem to reach the high school at an earlier age. I am not willing to enter a spelling-bee with some of these later-trained fifth graders. Externally, they are educated in a hotter oven than we were, but somehow they don't always come out done brown from crust to dough.

Forced by modern society to dodge motor traffic and gang gatlings, these shell-shocked boys and girls of our era do not get time to dry behind the ears before they become soaked in sophistry. Not content with a city conquest, the educators are invading the rustic regions with the standardized sophistication. They can't let the country boy alone to study botany and zoology first hand, but they inveigle him to get his father to fatten a calf for him, like the Biblical hero, so he may bewilder himself with a free excursion to the hectic metropolis. Why not reverse the system and offer prizes to city youth so they may win trips to the land of simplicity?

Were we able to rid ourselves of this phobia of sophistication, widespread and universal, I doubt if we would worry so much about the surplus or the standards-of-living level.

Worst of all, this sophisticated complex has gone from the realm of the material into the zone of the spiritual. The hoodoo or voodoo cults and the spiritualistic clans, and all the race of doubters and necromancers have arisen and grabbed hold of our generation. The result is that spiritually we have left a "piece" of mind rather than the other kind. We don't know where we're going, so let's have a grand time while we are here!

That's why I am sometimes thankful for a simple mind. I have kept it fairly well intact as it was handed down to me by a race of peasants from Great Britain. I enjoy being dumbfounded, surprised, and overwhelmed, no matter if it is several hours after everybody else has had their shot in the arm. Yet it doesn't take an earthquake or a revolution to startle me, and I marvel still at the typewriter and the fountain pen—even more than at the things I commit with them.

But I acknowledge that this is not the age of innocent contemplation. The doer has a place alongside the dreamer. The former has to match modern wits with the wise ones; and it is left for the non-conformists to settle back in the old loafer lounges, light our pipes, and cogitate, while the rest cash in.

IF all that sophistication can do for us is to breed a race of doubters and victims of boredom, then lead me back to the moss-grown village street. I would prefer to be sweetly calm in retrospect than alarmed and anxious in feverish anticipation. I would rather know a lot about a little than a little about a lot.

FOR THE BLIND

A small storekeeper, to the surprise of his brethren, suddenly decorated his window with a gorgeous new blind.

"Nice blind of yours, Isaac," quoth his neighbor.

"Yes, Aaron."

"Who paid for it, Isaac?"

"The customers paid, Aaron."

"What! The customers paid for it, Isaac?"

"Yes, Aaron. I put a leedle box on my counter 'For the Blind.' And they paid for it."—*Sunshine.*

Man (having given up his seat in the street car): "I beg your pardon."

The Girl: "I didn't speak!"

The Man: "Sorry, I'm sure. I thought you said 'thank you'."

—*Optimist.*

Rastus and Liza were roller skating when suddenly Liza fell, but flopped over and came up again with remarkable agility. "Did you all see how quick ah recovered mah equilibrium?" she asked.

"Ah sho did," he answered, "and almost before ah noticed it was uncovered."—*Pointer.*

A woman's final decision is often very different from the one immediately following it.

BRIDGE LAMP

Cop: "Hey, what are you trying to do?"

Drunk: "I'm trying to pull this lamp off the bridge, hic, my wife wants a bridge lamp."—*Typo Graphic.*

AN EXAMPLE

Mother: "Why were you kept after school today, Johnny?"

Johnny: "Teacher told us to write an essay on 'The Result of Laziness' and I turned in a blank sheet of paper."

Lecturer—If I should lead a jackass up to a pail of water and a pail of beer, which do you suppose he would drink?

Soak—Water.

Lecturer—That's right. Why?

Soak—Well, you said he was a jackass, didn't you?

Take a rubber snake along when you go out to play golf, and if you have trouble getting out of a sand trap you can hold the snake up and holler to the other players that you finally killed it.

MANSLAUGHTER OR MAN'S LAUGHTER

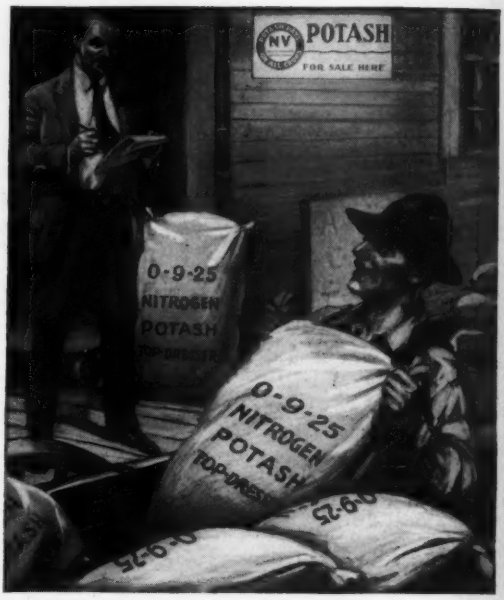
A man arrested for murder bribed an Irishman on the jury to oppose the death penalty, and hold out for a verdict of manslaughter.

The jury were out for a long time, and finally came in with a verdict of manslaughter. The man rushed up to the Irishman and whispered: "I'm tremendously obliged. Did you have a hard time of it?"

"The devil's own time, me lad, the other eleven all wanted to acquit you."

—*Indemnity.*

. . This is a
TOP-DRESSER YEAR



MOST cotton was poorly fertilized at planting this year. It is more important than ever to make sure that plant food is well balanced by using the proper top-dressing. To meet the situation, leading fertilizer manufacturers are marketing mixed-goods nitrogen-potash top-dressers containing 10 to 25% potash. These top-dressers cost less per ton than straight nitrogen top-dressers, yet they usually contain more plant food. The nitrogen in the mixture is more valuable as fertilizer because it is balanced with potash.

Thousands of farmers have found that it pays to top-dress with potash. They proved that the average fertilizer used at planting contains only about one-third as much potash as cotton needs to produce its best crop at low cost. Potash top-dressing added extra yields and extra quality out of all proportion to the small added expense of the extra potash.

Potash puts the cotton plant quickly on the job and keeps it working hard until a full crop is made. Potash-fed cotton keeps growing and maturing fruit through wet or dry seasons, even under severe boll-weevil conditions. It stays green later and holds its fruit longer, making full mature bolls that are easier to pick.

Potash produces healthy, high-yielding cotton plants . . . sets more squares for bigger yields . . . prevents rust . . . helps control wilt . . . reduces shedding . . . makes bigger bolls and better lint.

POTASH PAYS ON ALL CROPS — NV — POTASH EXPORT MY. — TRADE MARK REG.

Your top-dresser should contain 50 pounds to 100 pounds of muriate per acre for cotton; 50 pounds of muriate for corn; 100 pounds for peanuts; and 100 to 200 pounds of muriate or sulphate for potatoes. All truck and fruit crops show a profitable response to potash top-dressing.

N. V. POTASH EXPORT MY., Inc., Hurt Bldg., Atlanta, Ga.

Printed in U. S. A.